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A Special Motor Boat Show Number of MoToR BoatinG will be published on December 10th, the day on which the Motor Boat Show opens in Grand Central Palace, New York City. This special Show Number will be an extra number of MoToR BoatinG, and will go to our regular subscribers. It will also be distributed from our booth at the Motor Boat Show. It will be a complete guide to the show, and contain a description of the many exhibits at the Palace.

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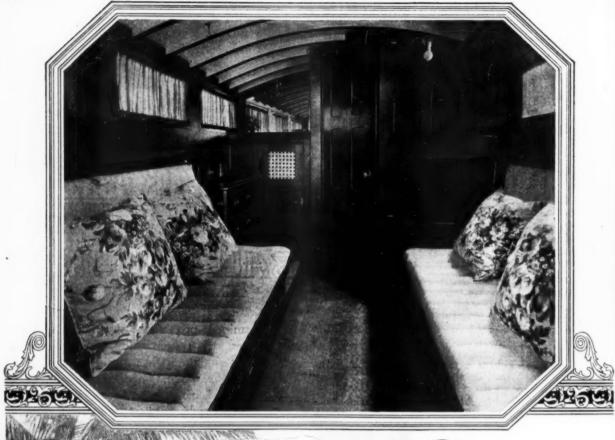
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Ball, Roller, Thrust and Combination Bearings



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The twin screw six-cylinder power plants give the 54-footer a turn of speed of 20 miles an hour or more.

You are invited to write for Catalogue No. 326.

### GREAT LAKES BOAT BUILDING CORPORATION

Milwaukee

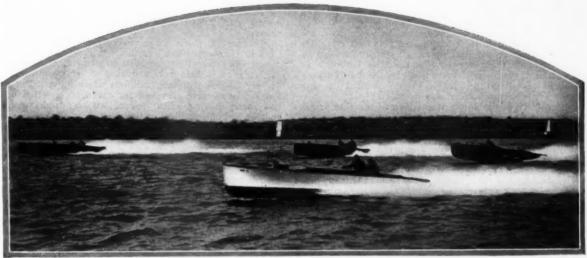
Wisconsin

"Largest Builders of Express Cruisers in America"

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# MOOR BOAING



Start of the race for 12 cylinder runabouts at Buffalo. It was in this race that Miss Nassau averaged 48.8 miles per hour for 20 miles

# What 1920 Has Taught Us

Advancements Made in All Branches of the Sport and Industry as a Result of Lessons Learned From the Season's Racing Events—Plans and Prospects for Next Year — Changes in the Racing Rules

By Charles F. Chapman

THE season just closing has been a banner one from a racing standpoint. There has been more high-class racing than ever before, better boats participating, closer results, few breakdowns and postponements and a general tendency to consider that racing means more than a mere sporting event, that it teaches a great deal about the possibilities of marine engines and boats under the most severe conditions. Much of the development and present status of hulls and power plants can be traced directly to lessons learned by the builders and owners in past racing events.

The advancements made by the numerous points which the racing season of 1920 has taught are bound to be many and important. As a result, the motor boat of tomorrow will be better than ever before, it will be faster for those who desire speed, it will be safer and drier for those who like to go to sea, in short it will be a better all 'round boat.

The one particular feature of the racing season of 1920 which stands out above all is that a 50-mile an hour runabout is a sane and practical outfit. Up to this year, sucn a boat has been in one's imagination only. Now it is a fact. There have been several 1920 craft, large, comfortable and roomy, which could be counted on to go better than forty miles an hour day in and day out. These were real boats in every sense, not racing machines or light soap box shells. This development has been the direct result of the season's racing.

development has been the direct result of the season's racing.

Racing in America can be logically divided into two classes or divisions: First, we have racing of hydroplanes and fast runabouts which race without handicaps or time allowances. Secondly, we have racing for slower boats, such as handicap cruiser events.

Different sections of the country feature each of these dif-

ferent kinds of races. The racing of this first kind, that is for hydroplanes and fast runabouts, centers at Detroit, Buffalo and in Florida. The racing of cruisers under handicapping rules quite naturally centers where there is a chance for off-shore racing—that is, on the Atlantic Coast. Both New York and Philadelphia seem to be the centers for cruiser events. The Mississippi Valley is mostly interested in class racing and limited piston requirements.

In the matter of new records established, 1920 will probably go down as the greatest record-breaking year in the history of the sport. New speed records have been established in all classes.

In considering the most important events of the season, of course the performances of Gar Wood's Miss America and Miss Detroit V stand at the head of the list. After winning the British International Trophy in England on August 10th and 11th, these two boats on returning to this country established new speed records in the Gold Cup and One-Mile events under American Power-Boat Association rules.

events under American Power-Boat Association rules.

As is well known, Miss America, owned by Commodore Wood, won both the American Power-Boat Association Gold Cup as well as the One-Mile Championship Trophy. The best speed made in this year's Gold Cup event was at the rate of 70 miles an hour flat for one complete heat of 30 miles. Miss America's best lap of 5 miles was at the rate of 71.4 miles an hour. For the total race of 90 miles, Miss America's speed was 62 miles an hour. All of these speeds are far in excess of the old Gold Cup record which has been standing since 1917 and held by Miss Detroit II.

In the race for the One-Mile Trophy, Miss America also

In the race for the One-Mile Trophy, Miss America also established a new world's record, averaging 76.66 miles an hour in her six one-mile heats. This record betters the old

record of Whip-po'-Will Jr., the American Power-Boat Association One-Mile Champion since 1918, by over 13 miles an hour. It is also interesting to note that this record of Miss America for six one-mile dashes is, roughly, 23 miles an hour better than the one set by Tech, Jr., in the one-mile race on Manhasset Bay in 1915. It is also interesting to note that at each succeeding A. P. B. A. race for the One-Mile Championship of America since the first race was held in 1914, the speeds have been better each year. They have increased in six years from 51.7 miles an hour to 76.7 miles an hour, an increase of just 25 miles an hour in six years.

The performance in the hydroplane division next worthy of note is that of Miss Toronto II. This boat established a new world's record for single engine hydroplanes at this year's races at the Thousand Islands. Miss Toronto's performance at the Toronto races was also worthy of note although lack of competition probably prevented her from

doing her best from a speed standpoint.

It has been in the Displacement Racer Class that perhaps the greatest progress has been made during the past year. The Gold Trophy offered by Mr. Carl G. Fisher of Indianapolis was for the displacement boat class. This race was held in Detroit in September. The primary motive of the requirements of this Deed of Gift, was to develop a healthy, fast runabout which would be of use for other purposes besides racing. The requirements of the Deed of Gift stipulated

that only stock marine engines would be allowed and that the race should consist of three 50-mile heats without repairs, or adjustments of any kind to the motors or boats between heats.

tween heats.

The race for the Fisher Trophy produced exactly the type of hull and power plant that was anticipated. The race was a success in every way and proved the wisdom of the restrictions suggested by Mr. Fisher and adopted by the Association. All of the boats

were of excellent type and the manufacturers of the engines spared no expense or pains to make their products the best that had ever been turned out by a marine engine

manufacturer.

Six entries were received for the Fisher Trophy Race, one of which (Mr. Fisher's own entry) was unable to start. The other five made an excellent race from start to finish. Practically all the boats came through with perfect scores. No complaint was heard from any side about the rules and the race proved very popular from the spectators' standpoint.

The Fisher Trophy was won by Rainbow, owned by Mr. Greening of Hamilton, Ontario. This boat covered the 150 miles at a speed averaging 36.7 miles per hour. The best speed for one heat of 50 miles was at the rate of 37.2 miles

per hour.

Southern racing conducted by the Miami Beach Yacht Club proved a very important feature of the racing programme this year. Altogether about twenty events were held, including off-shore races without handicaps for express cruisers as well as events on inland waters for displacement runabouts. Several new records were established in these races. The principal winners in the Florida Races include Miss Nassau and We-We in the displacement racer class and Gar, Jr., Hoosier V, Shadow V and Altonia in the cruiser events.

On the St. Lawrence River, the Thousand Islands Yacht Club held their annual races this year as usual, with classes for both hydroplanes and displacement runabouts.

Miss Toronto won the Thousand Islands Challenge Cup, a race of 505% miles in two heats at a speed of 55 miles an

hour. Brush By, of the Thousand Islands Yacht Club, won the Displacement Racer Championship of the St. Lawrence River, the race consisting of 395% miles in two heats at a speed of 37.1 miles per hour.

The sanctioned races held by the Toronto Motor Boat Club on September 6th and 8th, were as successful as usual, although there was a lack of entries from the United States. As already mentioned, Miss Toronto II was the winner in her class while Heldena II, a displacement runabout owned by F. R. Miller and Leopard V, a displacement runabout owned by Griffith Clark of Toronto, won in their respective

classes.

RACING DATES FOR 1921

August 11, 12, 13.... Fisher Trophy Races at Buffalo, N. Y.

August 17, 18, 19.... Thousand Islands Challenge Cup races

August 27, 29, 30 . . . · Gold Cup, One Mile Championship and Wood-Fisher Trophy races at Detroit.

September 3, 5, 6....Races for British International Trophy

On the following four pages will be found illustrations and

the speed records of all the famous racing craft, hydroplanes,

September 5, 6, 7...Races at Toronto.

cruisers and runabouts, of the past several years.

on the St. Lawrence River.

provided challenge is received.

February 10, 11, 12. Fisher Trophy Races at Miami, Fla.

The races at Buffalo conducted by the Buffalo Launch Club in October of this year were a new feature on the American Power-Boat Association's racing programme, The races at Buffalo were a success in every way in spite of very adverse weather conditions which prevailed at the time. Classes were arranged for runabouts powered with 12-cylinder motors, boats powered with 6-cylinder motors and for hydroplanes. All of the races were planned to consist of three heats. The heats for the larger runabouts and hydroplanes were of 30 miles each and for the smaller runabouts the races consisted of three heats of 20 miles each.

Both of the classes for runabouts were a success in every way. There were four starters in each class. Miss Nassau entered from the Motor Boat Club of America, won the race

for 12-cylinder runabouts in three straight heats at a speed of 46 miles an hour for 80 miles. Her best race was the last heat of 20 miles which was covered at the rate of 48.8 miles an hour, a new world's record for runabouts.

In the class for 6-cylinder boats, the trophy was won by Brush By of the Thousand Islands Yacht Club. Brush By's speed for her three heats totalling fo miles was at the rate of 32.2 miles per hour. In the

hydroplane class, Miss Toronto II won. This race, on account of bad weather, had to be reduced from the original plan of three heats of 30 miles each, down to one heat of

Turning our attention to handicap events for a few moments, we find that the greatest interest in these races has been in New York City. Detroit also held several

races for cruisers during the Gold Cup Races.

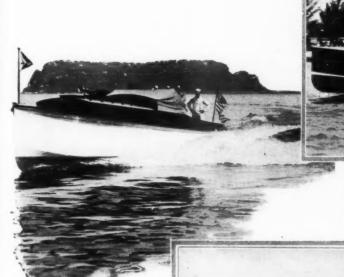
Sanctions for cruiser races were issued to the Columbia Yacht Club, the New York Athletic Club, the Hudson River Yacht Club and the Tamaqua Yacht Club. As usual, all of these events were well handled by the respective local committees. Competition in all of these events was especially keen and the results close.

Thetis, of the New York Motor Boat Club, proved the winner in the race held by the Columbia Yacht Club. Gardena and Victory II were winners in the ocean race of the New York Athletic Club; Kodak in the race of the Hudson River Yacht Club and Champ and Falcon in the race of the Tamaqua Yacht Club. Lidwina III, owned by Commodore Egan of the Buffalo Launch Club, proved to be the winner in the cruiser race held by the Detroit Yacht Club.

The record of the season's activities would be incomplete without special mention of the American Power-Boat Association Championship Cruiser Race. This race was for a trophy presented to the American Power-Boat Association by the New York Athletic Club. The title of "championship cruiser" goes to Victory II, owned by Commodore H. A. Jackson. This boat was able to win the championship race of 48½ nautical miles in a field of 19 competitors which

(Continued on Page 154)

# Champion Cruisers and How Fast They Went



- 4

Gar Jr. (1920) Best speeds: 2 miles 34.45 m.p.h., 20 miles 31.95 m.p.h. Mile Trials (average of 6 one-mile dashes) 36.6 m.p.h. Length of hull about 40 feet. Power 450 h.p. Liberty

Countess (1916) Best speeds:
New York to New Bedford,
161 miles, 21 m.p.h., New
York to Block Island, 115
miles, 27.3 m.p.h. Length of
boat 39½ feet, beam (water
line) 7½ feet. Power 8 cylinder 6x6 Van Blerck

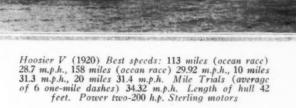
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SC 131 (1919) Bermuda to New York (660 miles) 56 hours, 56 minutes, 11.6 m.p.h. Length of boat 110 feet. Power three 220 h.p. Standard motors



Flyaway III (1915) New York to Cornfield and return (210 miles) 20.3 m.p.h. New York to Albany and return (235 miles) 21.4 m.p.h. Camden-Baltimore (1914) 424 miles, 17.8 m.p.h. New York to Block Island, 115 miles, 26.4 m.p.h. Length of boat 38 feet x 7 2/3 feet (w.l.). Power 6 cylinder 5½ x 6 Van Blerck

# How Fast Have Famous Speed Boats Gone?

The Best Official Speeds Made by the Winners in Races Since 1915

Miss America, fastest boat in the world—Best speeds: British International Races (38.1 miles), 61.5 m.p.h.; one lap (7.62 miles), 65.1 m.p.h. Gold Cup Races, 1920 (30 miles), 70.0 m.p.h; one lap (5 miles), 71.4 m.p.h. One-Mile Trials: Average of six one-mile rins, 76.655 m.p.h.; best mile down stream, 77.698 m.p.h. Length of boat, 26 feet. Power, two 440 h.p. Smith Liberty motors

Miss Detroit V (1920)—Best speeds: British International Races (38.1 miles), 60.5 m.p.h.; one lap (7.62 miles), 61.4 m.p.h. Gold Cup Races (30 miles), 60.9 m.p.h.; one lap (5 miles), 61.9 m.p.h. Length of boat, 38 feet. Power, two 440 h.p. Smith Liberty motors

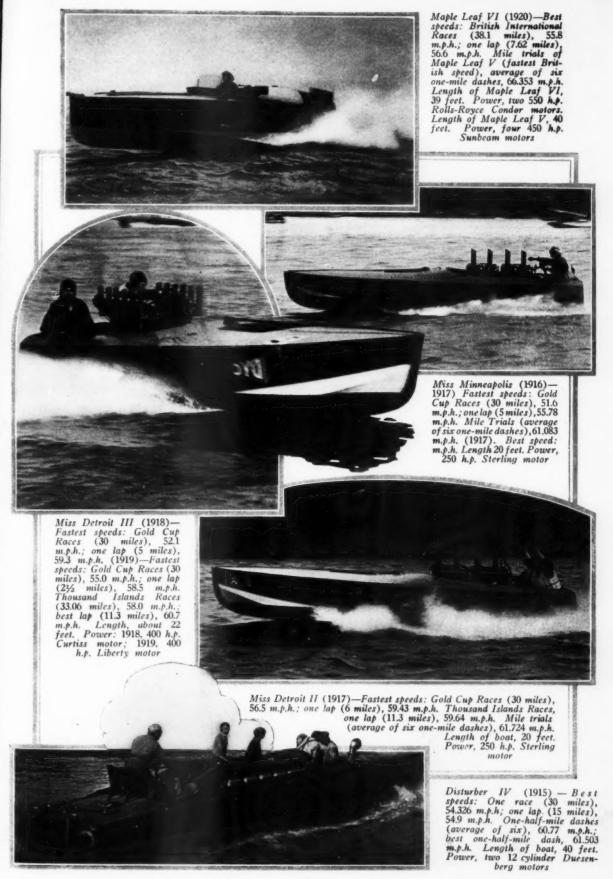


Miss Toronto II (1920)—Best speeds:
Thousand Islands Races (2956 miles),
52.99 m.p.h.; one lap (6 miles), 60.0
m.p.h. Toronto Races (30 miles), 56.8
m.p.h. Gold Cup (30 miles), 60.4
m.p.h.; one lap (5 miles), 62.2 m.p.h.
Mile Trials, Mississippi River, 68.4
m.p.h.; Toronto, 65.1 m.p.h. Length of
boat, about 22 feet. Power, one 440
h.p. Smith Liberty motor

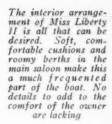
Whip-po' Will, Jr. (1918)

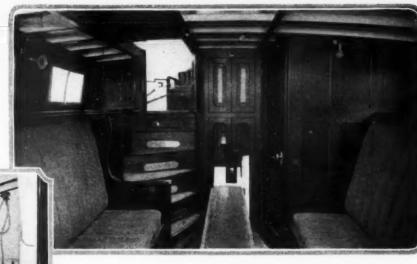
Best speeds: Gold Cup
Races (30 miles), 52.9

mp.h.; one lap (5 miles),
55.0 m.p.h. Mile trials (average of six one-mile dashes), 63.498 m.p.h.; fastest
mile (down stream), 65.017.
mp.h. Length of boat,
about 27 feet. Power, 400
h.p. Van Blerck motor





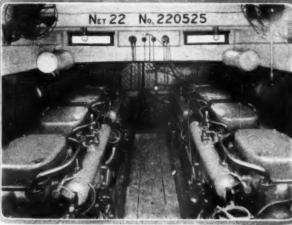




# Miss Liberty II

An Unusually Handsome and Fast Cruiser Launched by the Great Lakes Boat Building Corporation

An unusual feature is the installation of an overhead shower bath with hot and cold vater in addition to all the usual and necessary fittings of the bathroom



Miss Liberty II is a one-man boat. Com. Humphrey Birge, her owner, travels all over the Great Lakes with the aid of a captain-engineer who navigates the boat and handles the power plant at the same time

A pair of 300 h.p. 8-cylinder dual valve Sterling motors drive this 62-footer at 30 miles. The reliability of this power equipment is such that an engineer to stand watch over the motors is deemed unnecessary



# Fog Robbed of Its Terror

A Demonstration of the Practicability of a New Electric Device Which Enables the Mariner to Enter A Harbor at Any Time

By F. W. Horenburger



Earl C. Hanson, the inventor of the Audio Piloting cable system installed in New York Harbor

173

150

125

Graphic chart showing the average number of hours of fog per year along the Atlantic Coast up the magnetic field created around a submarine cable energized by a low-frequency alternating current. This submarine cable is laid in the center of the channel and in a permanent installation would be securely anchored in position. A source of power at a shore station generates an alternating current of 500 cycles at 375 volts with a strength of about 3.5 amperes and a power consumption cost of approximately ten cents per hour. The flow of current in the cable can be interrupted by means of an automatic transmitter which can be adjusted to send any desired combination of dashes or letters. On the tests under discussion the letters N-A-V-Y were being used and transmitted automatically.

To go back in the history of this device it is necessary to refer back several years. In July, 1916, MoToR BoatinG was proud to disclose to the yachting world the first news of this invention. Earl C. Hanson of Los Angeles had perfected a marvelous device to enable ships to navigate with safety, the most intricate channels in the heaviest fog. Being then, on the verge of war, the Navy Department promptly scized upon the invention in view of its great possibilities in this direction. The inventor turned over to the Navy Department all of the essential secrets of the device and it was developed to its final stage for navy use by the experts of the department, under the direction of Commander S. C. Hooper, U. S. N.

The commercial application of the same principles and

devices follows the same theory although the apparatus will not be identical. The proposal at the present time is for the Navy Department to install and maintain these submarine cables at the most dangerous points and in the busiest harbors along our vessels will be Navv coast. equipped with the receiving coils and Audio-apparatus and conse-quently be independent of the fogs. One of our illustrations will show the prevalence of fog along our Atlantic Coast. These data are authentic and the delay and cost to shipping caused by these many hours of fog are yond belief. A recent case was the delay caused to the entire Atlantic Fleet by a heavy fog of several days duration. The fleet was compelled to lay-to off the harbor entrance and was practically helpless for days. Merchant shipping was also hampered and heavy losses incurred by the ship owners whose vessels were held up. Reliable information places the cost of

the delay to a high speed passen-ger steamer of the Mauretania type to as high as \$4,000 per hour. Of what use is all the expensive high-powered turbine equipment of these vessels if they are compelled to wait for long hours while an obstinate fog slowly lifts. There is little or no delay in making the passage across the ocean. It all occurs at the harbor entrances. The installation of simple audio receivers costing less than the cost of an hour's delay to a big ship will overcome this loss. Records from the fog signal stations show that at Ambrose Channel Lightship there have been on the average 946 hours

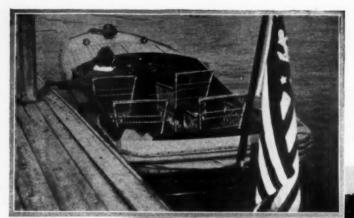
(Continued on Page 154)



Commander R.F.McCon-nell, U. S. N., who is in charge of radio activities in the third naval districk

The starboard coil on the destroyer Semmes. For permanent use, a smaller size coil is equally effective

Airplane view of the Approaches to New York with the location of submarine Audio piloting cab'es



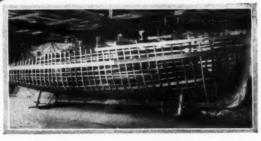
### Richardson Boat Company's Well Built and Practical Craft

Boats Which This New York State Concern Has Recently Turned Out Are Splendid Examples of Yacht Work

Comfortable runabouts with large
cockpits, all controls
at the helmsman's
position, motor forward and entirely
closed in and with a
good turn of speed
is the type of craft
in which Richardson
specializes

A 28 ft. x 6 ft. Rich

ardson boat with a 75 h.p. Scripps A 32 ft. x 7 ft. Hand V-bottom boat, built by Richardson, powered with a 90 h.p. Sterling motor which makes a speed of 20 m.p.h.



Knock-down boats and completed frames are also specialized in by the Richardson Boat Co.

Edith, The First Hand MoToR BoatinG Runabout



The 15-foot runabout designed by William H. Hand for MoToR Boating, complete plans of which were published in the January issue. This boat was built by Edwin W. Palmer in 23 days. The power is a 9-12 h.p. Universal. The cost was rather high but no time or material were spared. The labor was \$148.00, lumber \$83.82, hardware and fittings, etc., \$143.33, and the engine \$325.00, making a total of \$700.15. The boat was finished bright with shellac and Valspar and made a fine appearance

# Annihilating Space in a Sea Sled

Remarkable Results Attained in a 32-Foot Sea Sled When Equipped With a Pair of Sterling Motors



ate

**Out** 

ork

BEFORE the day of the high-speed Sea Sled, which type was originally developed more with the idea of obtaining a high-speed racing boat and later in connection with the war so that it would be possible to launch a land airplane far out at sea from the deck of a boat, which must necessarily be moving fast enough to permit the plane to hop off without a platform, high speeds on the water were not undertaken except as a racing stunt pure and simple. The present-day developments in Sea Sled construction are such that it is thoroughly practical for anyone to travel and enjoy speeds up to 40 m.p.h. without discomfort or danger. The privileges of travelling at these high speeds are

One is enabled to move from place to place rapidly and with comfort. Shallow water is no hindrance as the draft of these boats is very small. Should weeds be encountered they will not delay the journey as the surface type propellers used on these boats are capable of driving through the heaviest weed growths without hindrance or entanglements in the propellers. The arrangement of sur-face propellers as used on these boats is extremely satisfactory. There is no outboard shaft to be injured should a submerged obstruction be The inboard shaft encountered. being exceptionally large and sturdy is practically safe from bending even though the propeller strikes a rock and is itself destroyed. Many boats at a high speed will throw quantities of spray high in the air which blows back into the faces of the passengers. The Sea Sleds overcome this difficulty by the peculiarities of their design. It is safe to say that the Sea Sleds are the driest boats there are under all conditions. The modern Sea Sled when equipped with a pair of model GR Sterling motors with overhead dual valves, when turning at 1500 r.p.m. these motors will develop 225 h.p. each. Driving twin surface propellers, the speed of the Sea Sled will range from 40 to 41 m.p.h. A much higher speed is possible in this boat with the same engines but, primarily, it is intended as a Sea Sled cruiser, capable of maintaining 34 to 35 m.p.h. without difficulty. The engines have ample difficulty. The engines have ample power to drive the boat and hold the speed without strain.

Among the late models of Sea Sleds is a standard 32-foot by 8-foot type which has been modified into a most comfortable high-speed craft for private service. The addition of deep-spring upholstery, double refrigerators, a folding windshield and top has converted the forward cockpit into a roomy sheltered compartment. Model GR Sterling motors have handled this boat in spite

of the added weight.



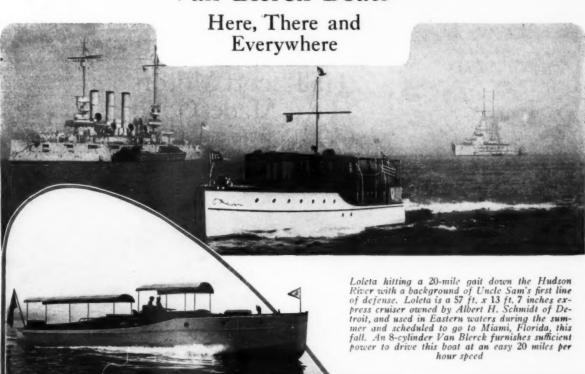


Tom Farmer's Turtle, a 36-footer which proved a factor in this summer's long-distance races around New York City, Turtle has a 4-cylinder 5½ x 6 Van Blerck which gives her a speed of better than 11 miles per hour



Sea Wolf IV, the fourth of the family of the same name owned by LeRoy Moody of New York City. Sea Wolf is a 40-footer designed by Kromholz and built by the College Point Boat Corp. Her power is a 6-cylinder Van Blerck

## Van Blerck Boats



Day Dream, owned by John Aspinwall of Newburgh, N. Y., and operated from his summer home at Medomak, Me., is a 45 ft. x 10 ft. 6 in. x 3 ft. express cruiser, designed by William H. Hand, Jr. Equipped with an 8-cylinder model M-8 Van Blerck engine, Day Dream averages 22½ miles per hour

Spindrift is owned by C. H. C. Jagels of Summit, N. J. She is 50 ft. x 11 ft. 6 in. x 3 ft. and is powered with a 6-cylinder model M-6 Van Blerck engine, turning a 24 in. x 18 in. Columbia Ailsa-Craig propeller 1,250 r.p.m., which gives the boat a speed of 15 miles per hour







cruiser, yet it has accommodations for three or four persons, and is ideally adapted for short cruises. Although speed was an important factor in the design of this craft, the builders have embodied refinements in constructi which add comfort and luxury in a boat of this type. The simplicity of her lines, rugged construction, the interior finish and furnishings all go to make up one

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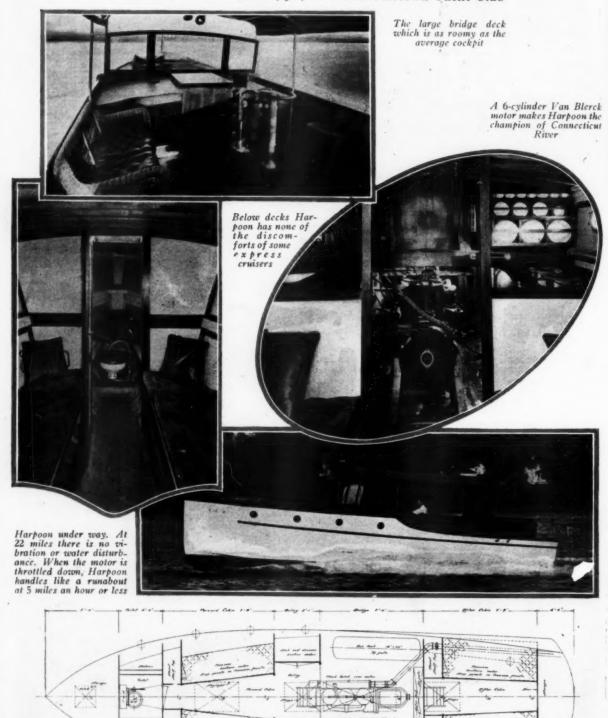
of the most successful boats to take the water this season. The power installation consists of two 200 h.p. Speedway engines, aluminum base and frame, controlled from the steersman's position. Here are the steering wheel,

age of rope and deck gear, followed by crew's toilet and crew's quarters.



# Harpoon, a Connecticut River Flyer

A New Craft, Designed by William H. Hand, Jr., for Vice-Commodore M. S. Cornell, Jr., of the Middletown Yacht Club



Profile and arrangement plan of Harpoon

# Wintons for Real Boats and Real Service

A big Winton Diesel ready to be shipped for installation

If anyone believes that the Diesel type of motor as well as the gasoline motor in large sizes is not a success for the powering of yachts and other large boats, they should visit the plant of the Winton Engine Works at Cleveland and they will be convinced for all times. There they will see the most modern shop that it is possible to build, they will see all the up-to-date tools and machinery for building large gasoline and Diesel motors which compare with the best and most up-to-date plants in any other industry, they will observe up-to-date production methods complete in every particular for turning out only the highest class of work—in short, there is no part of the Winton system that is incomplete.

Two recent Winton installations in particular stand out as a monument to the progress this company has made during 1920. One of these installations is in Elfay, the pioneer Diesel electric-

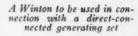


A corner of the Winton plant at Cleveland, Ohio

driven yacht. This is the first installation using a combination of electric drive and Diesel engines. The power plant consists of a 6-cylinder Winton Diesel engine rated at 115 h.p., direct connected to a 75-kilowatt generator. The entire ship is operated and controlled by electricity, including all auxiliaries.

Reports from Elfay, which has been making a voyage long enough to take her nearly around the world, indicate that the power plant and installation is a success in every way. The first run was of seventy-four hours' duration at sea into the teeth of a southerly gale during the entire time. By October 1st, the Winton engine had run upward of several thousand hours and had not given the least trouble in any respect.

Another successful Winton installation is in the motor ship

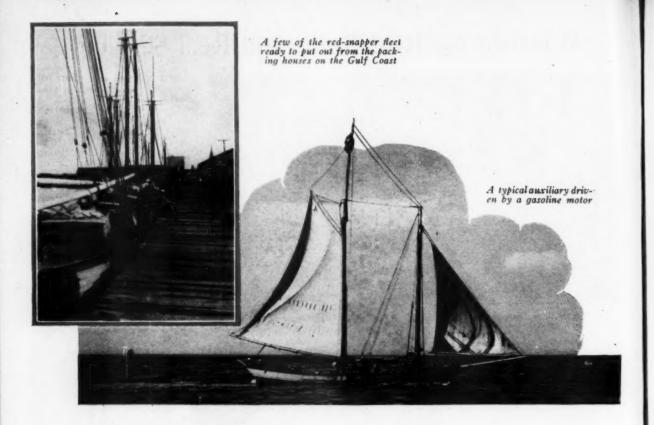




A 500 h.p. Winton being installed at Portland, Oregon

James Timpson. On August 21st this boat completed a continuous run of 2,600 miles, the motors having been stopped for only six minutes during the entire distance. Early in September the James Timpson completed a trip to Central America and back with a log cargo. When she arrived at New York the engineer had no repairs to make on the engine. The motor ship then proceeded to Baltimore. Her run from New York to Baltimore took 56½ hours for the 400 miles. On this trip she consumed 1,064 gallons of Texas oil or an average of 10.77 barrels of fuel oil per day. From Baltimore a run was made to Guantanamo Bay, Cuba.

which was covered in eight days without stopping the motors. The economy of the heavy oil internal combustion motor is surprising. Reports are being received continuously of long non-stop runs made from port to port.



# Motor Boats Now Factor in Fishing Industry

Great Increase During Past Year in Southern Commercial Fleet

By Harry H. Dunn

Photographs by the Author

THE motor fishing fleets of Louisiana, believed to be the largest of all such fleets of the various States of the Union, increased, according to the estimates of the Louisiana State Department of Conservation, for the year ending April 1, 1920, from 4,700 craft to 5,320. These figures do not pretend to be closely accurate, inasmuch as some of the boats work in one kind of fishing at one season of the year, in another at another season, and frequently in a third at still another season, depending on the closed periods decreed by law for the various sources of sea-foods. There are, for instance, five divisions of the fishing industry on the 300 miles of coast and 5,000 miles of inland waterways of Louisiana—salt-water fishing, fresh-water fishing, shrimping, oyster taking, and the miscellaneous fisheries in which are taken sharks, turtles, diamond-back terrapins, frogs and crabs.

Some of the men and boats occupied in salt-water fishing also handle shrimp in season, and go into the fresh-water fishing when it is at its best; many of those engaged in the oyster industry also take part in the shrimp industry, the seasons of the two sea-foods being different, so that they have work for themselves and their boats all the year around. Endless checking of name against name and boat against boat, with an involved card-index system alone would tell exactly how many boats and men are engaged in each industry and give an accurate total. It would seem that this increase of about 600 motor boats, however, would be about correct, as one agent alone, in New Orleans, has sold approximately 200 engines to work-boat owners of Louisiana in the twelve months ending August 1; another disposed of 172 in the

same period and a third, who seldom leaves New Orleans to make selling trips, told me he had sold 94 in that time.

#### MOST IN FRESH-WATER FISHERIES

Surprising as it may seem, the majority of these motor boats are engaged in the fresh-water fisheries, there being 4,095 in this branch, with 3,340 men at work in it, and 25,020 persons dependent on their production for support. The oyster industry comes next, with 505 boats engaged and 5,874 men working in it, furnishing a livelihood for 23,496 persons. The shrimp industry uses 500 boats, with 5,179 men engaged and 20,716 dependent on it for a living. It should be remembered, however, that more than 200 boats, owned in Mississippi and operated therefrom, are engaged in taking shrimp and oysters from the Louisiana marsh, inasmuch as the largest shrimp and oyster packing plants are in Biloxi, Miss., and a considerable fleet of oyster dredges and runners and shrimp schooners equipped with power travel the 150 miles or more into the Louisiana marsh to get material for these packing plants. This fleet is not considered in this sum-The Louisiana salt-water fishing industry falls considerably below any of the others in number of boats and men employed, though last year considerably more than a million dollars' worth of food fishes were taken from the salt waters of the State. Only 220 motor boats or auxiliaries are engaged in the Louisiana salt-water fisheries, with 887 men employed and 3,548 persons dependent on them for support.

The turn-over of the salt-water fisheries of the five Gulf Coast States—Texas, Louisiana, Mississippi, Alabama and Florida—is rather more than ten million dollars, according

to a survey of this industry made by the United States Bureau of Fisheries for last year. The combined product of all the fisheries of Louisiana, salt and fresh-water fish, shrimp, oysters and other sea-foods, for the year ending April 1, amounted to considerably more than half of this, though the salt-water fish production of the State was only about one-eighth of that of the entire Gulf Coast, Florida

being far in the lead.

Without motor boats, less than one-fifth of this harvest would have been reaped from the sea, according to the opinions of fish commissioners, sea-food packing companies and fishermen in the various States. Louisiana is the most advanced of all these States in the use of motor boats in the fisheries, though there are probably close to 10,000 self-propelled boats engaged in the fisheries around the rim of the Gulf. Much of the deep-water fishing, notably the redsnapper and grouper industry of Pensacola, Fla., is still carried on by large sailing smacks, though there is a steady movement toward the installation of power plants in these smacks, as rapidly as crews can be obtained who understand the handling of gasoline engines.

#### TENDENCY TOWARD GREATER SPEED

The majority of the 600 boats added to the Louisiana fleet of power fishing craft are what is commonly known as "runners," that is, the boats which are used for carrying shrimp and oysters to markets and to other centers of distribution, such as packing plants, from the larger shrimp trawlers and oyster dredge boats out at the edge of the Gulf, frequently 150 to 200 miles from the market or packing plant. These runners serve a double purpose, since they bring fish, oysters and shrimp to the market and carry back general merchandise to the fishing villages and to the iso-lated fishermen; ice to the fishing fleet and equipment to all

the boats and fishermen as well. The boats mainly used in oyster dredging are converted schooners and luggers; those in the shrimp industry mainly converted schooners, but the runners for both these industries have been for the most part luggers of a smaller size equipped with power or new boats built somewhat along modified lugger-hull designs. Theoretically their speeds should be from 12 to 18 miles an hour; actually it is around 9 to 14 miles, and a great many thousand dollars' worth of oysters and shrimp would be saved by the use of speedier boats in getting them to market. Despite the ice carried in these runners every trip, many hundred pounds of shrimp, oysters and fish are lost every week by their lack of speed, largely due to the old-type, slow, heavy-duty engines with

which they are equipped.

Even the most backward of the fishermen have begun to learn this, and the tendency in the newer boats is to greater speed. Concurrent with this is a difference in hulls, greater length and less beam, the shallow draft being retained, is noticeable. What is badly needed for these boats is a combination heavy-duty and medium-speed engine, suitable for slow work in heavy weather, which many of them encounter on the majority of their trips, but also able to provide more speed when quiet waters are reached. Some semi-speed engines have been tried in these boats by fishing companies and packers of sea-foods, but they have not worked out well owing to their tendency to fall down in heavy weather and bad seas.

#### EXPERIMENTS WITH OIL ENGINES

The fuel-oil engine of 15 to 30 horsepower is being tried out in some of the larger fishing boats, and Peter Johnson,

for a number of years agent for the Gullowsen-Grei engines in various parts of the country, is now perfecting a simple engine using crude oil and producing rather high speed, with a heavy-duty reserve at low speed. Though located in New Orleans, in the heart of the motor fishing-boat fleet headquarters, Mr. Johnson has had some trouble in getting a fisherman to allow experiments with this engine in his boat. Similar boats at Seattle and on the Mexican coast have given surprising results in decreased expense of operation and greater speed for work-boats.

The mounting price of gasoline has opened the field in the Louisiana fishing fleet to the crude-oil engine, if it can be had in 6 to 12 horsepower units, with service similar to that which is putting the motor truck into every agricultural district in the South. The auxiliary schooners of 200 tons and up operating in general trade between the ports of the Gulf and those of the Caribbean Islands and the mainland of Latin America are using these crude-oil engines of 50 to 240 horsepower effectively, but the smaller craft, such as those in the Louisiana fisheries, have not been able to do so owing to the inability to get these power plants in small enough

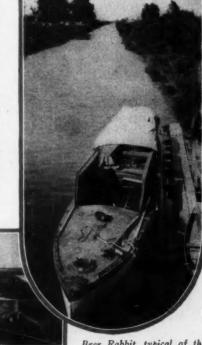
#### MILLIONS IN PRODUCTION

The harvest from Louisiana waters is virtually in its beginnings, as is evidenced by the fact that only 19,905 acres of oyster bottoms are being worked, while there are on the coast of the State at least 458,000 acres of bottoms capable of producing as fine oysters as any taken from those now being worked. It is estimated that the supply of shrimp on the Gulf of Mexico is inexhaustible, owing to the rapidity with which these crustaceans reproduce themselves, yet virtually all the shrimp trawling is done close in shore, while all the seining has to be done in waters not more than four or five feet in depth.

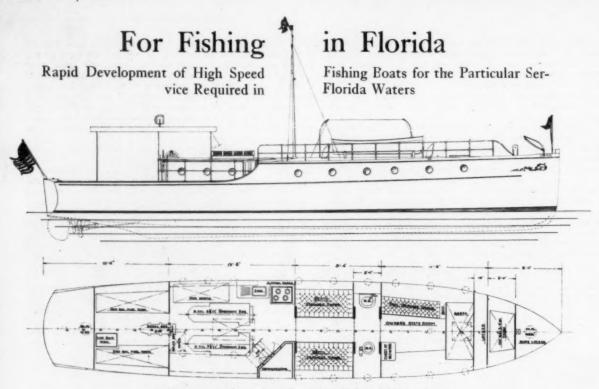
About seven times out of ten, when you eat an oyster, you will find that it came from Louisiana, and the percentage is about three in five in the case of the shrimp. Red snappers and groupers from Louisiana waters are shipped as far north as Winnipeg, as far east as Buffalo, N. Y., and they have successfully invaded the fish markets of Seattle and San Francisco. Louisiana's production of red snapper and grouper is small, however, compared to that of Pensagrouper is small, however, compared to that o cola, Fla., which is worth one and one-half million dol-

lars annually to that port.

By far the most important fishery of Louisiana is that carried on in her fresh waters, in taking catfish, buffalogaspergou, paddle-fish, paddle-fish roe, and gars. For the year ending June 30, 1919, the latest available figures, this fresh-water fishing industry pro-(Con. on p. 156)



Brer Rabbit, typical of the fast motor dispatch boats in use all over Louisiana



Arrangement plan and profile of fast 55-foot fishing cruiser

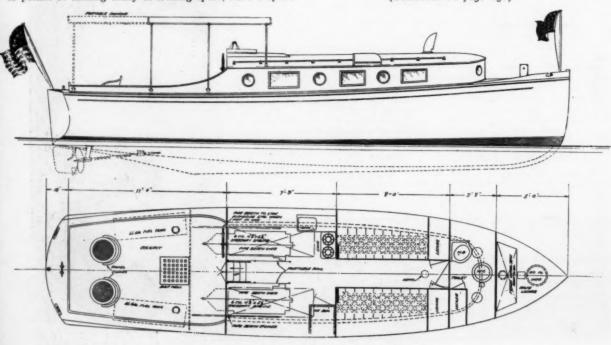
THE development of the Florida fishing boat has aroused considerable interest in the minds of many designers. Their talent, naturally, has brought forth many interesting points. The various factors which necessarily have to be taken into consideration follow a careful study of the requirements for a boat of this type. An investigation of waters frequented, speed, length, and accommodations is essential.

As a result of a careful examination of conditions, the fact is disclosed that an approach to the ideal boat for fishing service in Florida must fall under 40 feet in length, to permit of turning easily at trolling speed, have a speed

of at least 18 miles per hour with a flexibility that will allow the motors to throttle down to a trolling speed of two or three miles. A large cockpit is the third and important feature. These three points, length, speed and cockpit, constitute in the mind of the writer the fundamentals upon which to evolve a successful Florida fishing boat.

There now appears in the advertisement of a very prominent New York boat building company, a new Florida fishing boat design, embracing the three features above mentioned, i. e., length, speed and roomy cockpit. The designers of this boat we are told sent their representative to

(Continued on page 156)



A smaller boat equally fast, but only 36 feet 6 inches long

### The Venice of the East

Little Known Facts From the Users of Marine Motors in the Far East Who Have to Fit Their Motors to Use Kerosene

By Carl Clussen, Vice Consul, Bangkok, Siam



Irrigation canals are used for boating

A LEADING Siamese nobleman and a long-time user of small marine motors has recently written to this consulate stating that Siam is likely to afford a good market for such machinery, especially in the city of Bangkok, which is located along a large river and is intersected by innumerable canals. The number of boats now registered at the latter place reaches 400,000. In fact every one who lives near a waterway owns some kind of craft or other. Hitherto considerable difficulty has been experienced in finding a

motor adapted with apparatus for using kerosene for fuel, which appears to be very essential in this country owing to the fact that gasoline is rarely obtainable outside of Bangkok. This nobleman further states that excellent results have been obtained in the use of four-cycle American motors which, being originally intended for gasoline consumption, had to be converted into kerosene motors locally, using for this purpose a native invention, which the nobleman

"Up to a comparatively recent time American motor magazines were practically filled with articles describing two-cycle motors for which we living in this part of the globe had very little sympathy. In the first place, these motors use gasoline, which is in this part of the world very expensive and can only be obtained in large towns. Secondly, they were not economical in fuel consumption. In consequence, the two-cycle motors were used by only a few persons who did not take up motoring seriously, while those who wanted to get hard work and economy out of their

fully described in his letter, reading as follows:

boats went to Europe to buy their four-cycle motors. "Probably you may consider Bangkok quite an insignificant place, but nevertheless about 400,000 boats are registered here. The city of Bangkok is built on a large river and intersected by innumerable canals, and has therefore rightly been called 'The Venice of the East.' Every one that lives by a waterway has a boat of some kind to go about in and when the motor boat came it was very much appreciated.

"The first marine motor was introduced into this country twenty-five years ago by a Siamese canal company which wanted a power boat of light draft to be



This boat uses a Thornycroft kerosene motor



Even the youngsters motorboat up the river at the low water season





All motors in these passenger boats are adapted by their owners to use kerosene



osene as it is now, there would have been no difficulty in going anywhere, as kerosene can be obtained in any small village.

"I have just given you the above facts to let you know of our long experience with motors and motor boats in this country.

"Very soon after the introduction of motor boats we converted them to the use of kerosene instead of gasoline. The reason of course is that the former is much cheaper

American motor

papers again it was a pleasant

surprise to find

that there were

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few two-

Teak wood is used for boat building, it grows in Siam

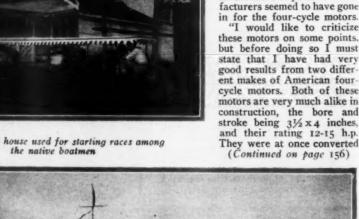
able to run in their canals during the lowwater season. The motor was of the original four-cycle Daimler class with hottube ignition and hit-and-miss control. It had two cylinders and was nominally rated at four horsepower, running between 600-700 revolutions per minute. was installed in a boat 25 feet long, 5 feet 6 inches broad, built locally of teak and copper sheathed, and of about 18 inches draft. The amount of hard work this boat has gone through is astounding. It is still running, but the engine has now high-tension magneto ignition and a vaporizer for kerosene, consuming one gallon per hour. Many years ago. Mr. Hamilton King, United States Minister to this country, having very urgent government business to do in a town about 400 miles up the river

during the lowwater season. commandered this boat on account of its lightness and shallow draft, but found that would it quite impossible to take a supply of gasoline sufficient to take him all the wav np and much the to bring back, as less him absolutely no

gasoline was to be had upcountry. If that boat had been fitted with a vaporizer for ker-



Floating club house used for starting races among

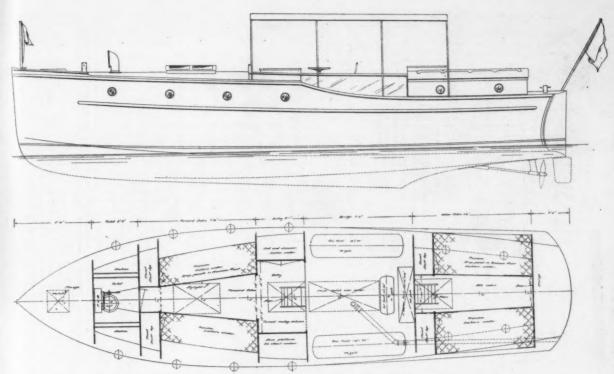




Doubledecked boats equipped with Diesel motors are very popular



Fast cruisers and floating boat houses are not uncommon on the numerous canals



Outboard profile and arrangement plan for Claire, a Hand V-bottom Express Cruiser

# Claire, a Hand 36-Foot Express Cruiser

Designed by Wm. H. Hand, Jr.

Exclusively for MoToR BoatinG

UR plans and specifications of Claire, the 36-foot Hand Express Cruiser presented herewith, are the last to be published in the present series. This boat for its length embodies all comforts and improvements to be found on a larger craft. The double cabin arrangement provides privacy for the party on board and at the same time affords ample accommodations. The lines and general appearance of this boat follow along the lines of other famous Hand V-bottom boats, and with the powerful J.V.B. motor specified should be able to give a very good account of herself. As a fast cruiser able to compete in any and all long distance races and competitions, Claire will be a hard one to beat. The seaworthiness of this type of boat has been amply proven. Many of these V-bottom cruisers have been out in weather and reports of poor behavior on the part of the boats still remain to be heard.

On this particular design the sections have been so developed to give a maximum amount of speed and seaworthiness for the power installed. In addition the interior arrangement has been

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to give a maximum amount of speed and seaworthiness for the power installed. In addition the interior arrangement has been well laid out. Ample storage space forward, together with a roomy lavatory. A forward cabin with transom berths and clothes lockers and a sizeable galley with stove, sink, ice box and cupboard and locker space. The motor is in a compartment by itself under the bridge deck and is very accessible. Tanks, storage batteries and all mechanical items are also concentrated here. The after cabin is complete and contains a pair of transom berths with suitable lockers. It does not seem that the construction of this boat comes quite within the possibilities of the amateur builder. This boat is a big one and the amateur builders who can make a successful job of this size boat are few and far between. A properly equipped shop can turn this boat out in a short order, while the amateur builder would be required to spend month upon months of spare time on the job.

The specifications which follow are unusually complete and

The specifications which follow are unusually complete and require no further explanation.

SPECIFICATIONS FOR CLAIRE A V-BOTTOM EXPRESS CRUISER Designed by WM. H. HAND, Jr., N. A. Dimensions

Length, overall, 36 feet; beam, extreme, 9 feet 1/2 inch; draft, 2 feet 61/2 inches.

#### General Conditions

The boat is to be built under a suitable housing. All the materials and manufactured articles, and articles of construction, of whatever kind and in every department, are to be the best in quality for their respective purposes.

All workmanship must be of the first class and the best, and the whole executed under the direction and to the satisfaction of the owner, or his duly authorized representative.

Work not shown by the drawings, or specified herein, but which is usual and necessary for a boat of this type, is to be done by the builder without extra charge.

done by the builder without extra charge.

#### Frame

Keel: To be of white oak, sided 3 inches and molded as shown. This part may be in two or three pieces, properly scarphed as shown. Section of keel in way of shaft to be

Stem: To be of oak or hackmatack, scarphed and bolted as indicated. To be rabbeted for planking and bearded to carry out all lines of same above L.W.L., except at head which is to be finished square, with a suitable cast brass stem band extending over top of head to a point about 2 feet aft of fore end of waterline, and neatly filed to show as narrow face as practical at and near L.W.L. Stem to be sided 3 inches and molded

as indicated.

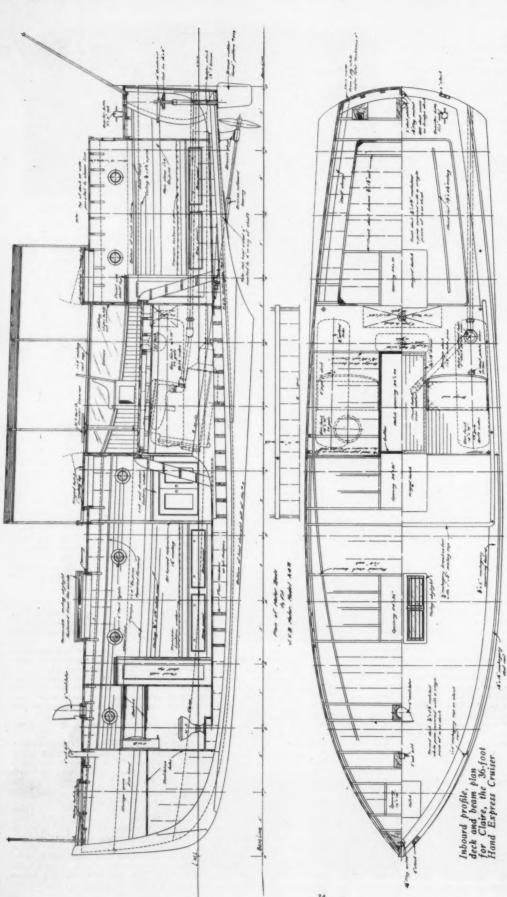
Apron: To be of Georgia pine 23/4 x 5 inches in one piece, securely fastened to keel.

securely fastened to keel.

Stern: The transom will be double planked of white cedar, total thickness 1 inch with white lead between bent to form on 6 foot radius. It will be supported in center by indicated hackmatack knee and reinforced at sides and bottom with suitable oak back rabbet pieces for planking fastenings. Planking to run by transom and be properly finished with angle brass trim, as will be directed.

Frames: All frames to be of white oak steam bent, spaced ginches on centers. Those under motor heds to be 1½ x 1½.

inches on centers. Those under motor beds to be 1½ x 1½ inches, all others to be 1¼ x 1½ inches. Heels of frames to be boxed into apron. All floor timbers to be sided the same as frames and carefully fitted on top of frames, and to be securely fastened to keel with %-inch galvanized bolts fitted with nuts and washers through heavy floors and 4-inch bolts through light floors. Frames to have the required filler pieces of white pine above and below chines as shown in cross section



plans. Frames to be fastened to chine with 3/16-inch or receive planking and riveted through all frames with suitable number 17 copper wire nails and where the bottom edge of copper rivets. Outer member of Georgia pine 1¼ x 2 inches side planking and the top edge of bottom planking join the to form square caulking seam, fastened securely through inner chines there will be a ¼-inch or number 18 copper wire nail member and bent frames with copper rivets as above specified, through planking, chine and frame. All copper fastenings to Clamps: Main clamps to be of Georgia or Oregon pine be properly riveted over copper burrs. There will be suitable 1 x 4 inches set as shown and extending from stern. To be riveted through each frame with two number 7 copper Chines: To be of Georgia pine, in two parts as indicated by wire nails. Clamps to be worked under beams of deck in plan. Both parts to run full length of hull. Inner members forward raised freeboard, to be of Georgia pine, 1 x 4 inches, to be 1¼ x 4 inches, set as shown and properly beveled to riveted through the head of each frame.

rail be end 1 x indi B on Chim two groups I/1 E ind wit

Deck Beams: All beams to be of white oak, sawn to form. Main deck beams in bridge and aft decks to be  $1/6 \times 2/4$  inches. Raised freeboard beams 1 x 2 inch oak. Trunk beams

Motor Beds: To be of 2½-inch oak or Georgia pine, set
Motor Beds: To be of 2½-inch oak or Georgia pine, set and securely fitted together as indicated and all bolts riveted through frames over heavy washers. Motors to be bolted to beds with galvanized bolts extending through fore and aft and bolted in accordance with plan. beds with nuts on under side.

Th than nails be pr

Frame in General: All exposed edges of stringers, clamps, frames, chines, deck beams, etc., to be neatly finished with chamfered edges. All parts to be carefully fitted to bear evenly and very securely fastened as specified.

#### Planking

The hull will be planked with white cedar to finish not less than 15/16 inch. To be fastened with number 10 copper wire nails riveted over copper burrs. All outside fastenings will be properly countersunk and bunged.

#### Decking

Raised freeboard deck to be 1/8 x 2½-inch matched white pine with chamfered lower edges, fastened into deck beams with galvanized boat nails with heads let in, smoothly planed with galvanized boat nails with heads let in, smoothly planed and bung fastened and entire deck except planksheers, covered with a single piece of 10-ounce duck laid in paint or marine glue and smoothed down into place. Edges to be hauled down over sides and neatly tacked where same will be covered by planksheers when in position. Flaps to be left around all openings, to be turned up on inner side of coamings when in position. Bridge deck and main deck to be of white pine 1 x 2 inches with bunged fastenings. Seams to be caulked with cotton and properly filled with marine glue seam filler. Decks to finish in varnish. Planksheers in raised deck to be of mahogany 3/8 x 6 inches. There will be a scupper of 1½-inch

on

of planking, frames, cic., where exposed, will be neatly finished and properly enameled white.

Flooring: All compartments to be floored with rift sawed Georgia pine, 34 x 3 inches, laid on suitable floor bridges. Center sections to be arranged to be removable and flooring

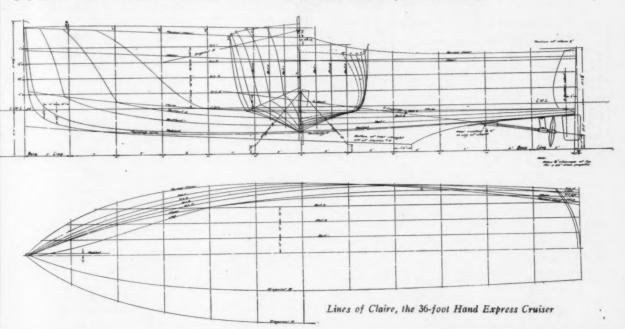
around motor to be removable in sections.

Doors: All indicated doors to be strongly made of material to match compartment finish, with neat panels, hung in suitable mahogany casings, on suitable brass butts with neat knobs and catches.

Forward Cabin: To be arranged as indicated with a toilet Forward Cabin: To be arranged as indicated with a toilet room forward, and two transoms with closets on forward end of same. Closets to have shelf tops of mahogany with neat rails around same. Closet doors in aft end. Transom fronts to be as indicated with drop panels. Shelf tops, turned columns, door casing, and small trim will be of mahogany. Transom fronts, toilet room, closets and bulkheads will be finished in white processive generated which the processive generated which the processive generated which the processive generated which the processive generated which are to the processive generated which are to the processive generated which the processive generated generated

white pine, properly enameled white.

Galley: To be arranged as indicated with sink and dresser, with lockers under on starboard side. Port side arranged with stove platform and ice chest under. Ice chest will have a zinclined ice compartment at top, provided with suitable air circuit lating spaces to food compartment below. Food compartment to be of white spruce finished in shellac. Suitable drains of 1/2-inch lead pipe from ice compartment arranged to lead directly overboard about on painted water lines.



lead pipe in each corner of bridge deck. Suitable leather valve to be fitted over outboard ends.

#### Deck Joinerwork

Chock Rails: There will be a mahogany chock rail or foot rail on forward raised deck as indicated by plans. Same to be formed of 1½-inch mahogany 2 inches high on forward end tapered to 1½ inches as shown. A neat mahogany cap 1 x 2 inches to be rabbeted over chock rail at forward end as indicated.

mdicated.

Bridge Seats: There will be seats of mahogany as indicated on each side of bridge deck.

Companionways: Forward and aft companionways to be of hinged type of mahogany.

4-inch lip over coamings.

Companionways to be fitted with two neatly paneled mahogany slides fitted in suitable mahogany grooved pieces arranged to lift out.

Hatches: There will be a hatch where indicated over motor.

grooved pieces arranged to lift out.

Hatches: There will be a hatch where indicated over motor compartment to match bridge deck. To be arranged with gutters to carry leak water to cockpit. Edges to be bound with 1/16 x 1½ inch flat brass as shown.

Bitts: Oak main and quarter bitts to be fitted properly where indicated. Same to be neatly finished and properly provided with ½ x 9 inch brass cavels.

#### Interior Joinerwork

Ceiling: There will be 3% x 2½ inch chamfered white pine ceiling in forward and aft cabins, toilet room, and galley. There will be no ceiling in the motor compartment. The inner sides

Motor Room: To be arranged as indicated under bridge deck with fuel tanks on each side, and cylinder oil and water tank

with rule tanks on each side, and cyander of the side of mahogany with rubber treads and nosings.

Aft Cabin: To be arranged as indicated with a transom and closet on each side. Drop panels in transom fronts to allow

access to locker space.

Miscellaneous: All removable hatches or floor sections to be Miscellaneous: All removable hatches or floor sections to be fitted with suitable brass lifting rings of flush type. The builder will supply and properly fit all necessary hardware of brass, to include door butts, catches, locks, drawer pulls and all minor items as required and approved. Door knobs in cabin to be of

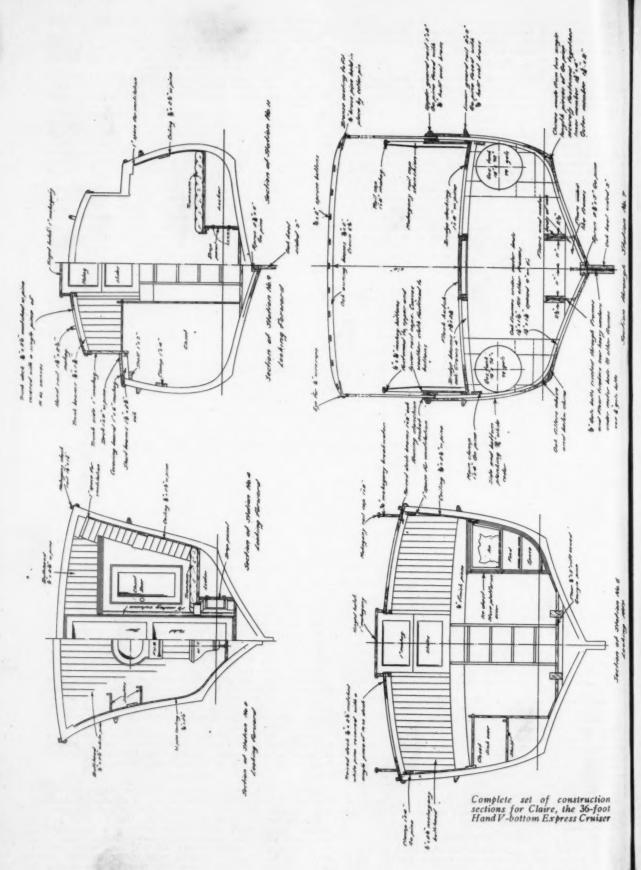
approved pattern brass.

Awning: To be as indicated with stanchions of ½-inch brass pipe supported by indicated bronze sockets. Awning battens of spruce ¼ x 2 inches, attached to stanchions by indicated bronze castings.

Top of 8-ounce khaki canvas.

#### Metal Work

Rudder: To be of manganese bronze Hand Pattern No. 456. The head of stock will be finished square. A suitable galvanized iron emergency tiller will be supplied to properly engage same. Steering Gear: There will be a W. S. Hall Co. chain and sprocket steerer fitted with a 17-inch wheel of proper height to conform with plan properly fitted where indicated. Same to be all brass with mahogany wheel rim with usual motor controls. To be properly connected with rudder quadrant by 36-inch diameter phosphor bronze tiller rope, led over suitable



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4-inch sheaves and through suitable guides as required, and fitted with turnbuckles to take up slack.

Strut: To be a bronze casting with a flax-lined bearing.

Outboard Bearing: There will be a bronze flax-lined bearing as indicated where shaft leaves hull.

as indicated where shart leaves hull.

Air Ports: To be four 6-inch air ports on each side of raised freeboard, and two 6-inch ports on each side of aft cabin trunk. To be of approved make, with hinged part inside of hull, with sleeves projecting through to outside. All metal parts to be neatly polished and fitted in the best manner. Stuffing-Box: There will be a Mechanical Devices Co., Pattern K.S. shaft log, to fit shaft, or equal, fastened in place securely as indicated.

Guard Trim: The indicated guard rails are to be faced outside with 26-inch half oval brass for entire length. The

Guard Trim: The indicated guard rails are to be faced outside with %-inch half oval brass for entire length. The rib-band at top of raised freeboard shall be trimmed with half

44.44

oval brass, 36 inch.
Hardware: The builder is to supply and properly fit all necessary deck hardware of polished brass, including bow and stern chocks, bow and stern flag staff sockets, cleats, bit heads, deck plates, companion locks of approved sizes; and all other minor items necessary to complete the hull in a workmanlike

#### Motor and Installation

There will be a 4-cylinder Model A 4-R J.V.B. motor complete with reverse gear, electric starter and generator, shaft, propeller and all parts to make a complete installation. To be properly installed by the builder as will be directed by the architect. All motor controls to be led to the bridge as required, with a suitable brass lever for reverse gear control and all details to be strictly in accordance with the best practice. All water piping shall be of brass, valves and fittings as required. All gasoline will be piped through ¼-inch soft copper tubing with approved valves and strainer as required. To be led to carbureter through a Stewart Vacuum system. The exhaust will be piped from manifold through indicated 246-inch exhaust will be piped from manifold through indicated 2½-inch galvanized fittings to indicated flange coupling. From flange coupling through stern the exhaust will be led through 2½-inch outside diameter number 18 copper tubing. Coupling next to manifold tapped for 1-inch pipe for circulating water discharges. All circulating water discharges through exhaust. Suitable valves to be supplied and properly fitted. Instruments to be mounted on bulkhead forward of steerer. There will be a Reliance Tachometer or equal, completely installed.

#### Plumbing

Gasoline Tanks: Under the bridge deck there will be two seamless tinned steel tanks, or equal, 18 inches diameter x 72 inches long, each with two transverse swash plates, standard filling plugs and ¼-inch up-feed-tube. Tanks to be supported in strong cradles as indicated. Fillers will be piped to indicated

There will be a great to hadred bridge deck where shown of 18-ounce tin-lined copper, arranged to fill from deck and properly connected to lavatory and galley sink with ½-inch lead pipe. Tank to have suitable swash plates.

Dimensions 44 x 12 x 15 inches deep.

Oil Tank: There will be a cylinder oil tank properly set and connected. Same will have outlet piped to motor as directed

with 34-inch brass pipe and necessary controlling valves. To be arranged to fill from deck. Dimensions 12 x 30 inches.

Toilet Room Plumbing: In toilet room there will be a foldavater closet where shown, properly connected for service. There will be a water closet where shown, properly connected with discharge and supply sea cocks. There will be a suitable nickel-plated towel rod, glass holder and paper box as required, also an approved mirror on bulkhead over lavatory.

Galley Sink: There will be a copper sink 12 x 14 inches in galley where indicated, properly installed with suitable drain overboard.

overboard.

Galley Pump: There will be an all brass galley pump properly installed and connected with fresh water tank.

#### Electric Lights

The motor equipment will include one electric storage bat-tery. The builder will supply and properly fit and connect with batteries, which will be installed in motor compartment as will be directed (with properly concealed wiring) the following brass electric light fixtures. In forward cabin, four lights of brass electric light fixtures. In forward cabin, four lights of suitable pattern; in toilet, one light; in motor room, two lights and one exploring light with 10-foot cord and sockets; in aft cabin, two lights. The builder will also supply a complete set of extra lamp bulbs, a set of electric running lights of size required by U. S. laws, together with the necessary plug wires and plugs to fit sockets, ready for use. Note: The bow light and side lights will be built up of mahogany light boards and freenal glass. fresnal glass.

Painting

Above indicated painted waterline, the topsides, including guards, are to be finished in required number of coats of the best white lead paint to give a satisfactory finish. Below waterline, the hull is to be finished with two coats of approved green non-fouling bottom paint, over one coat of red lead. There will be a dark green boot top stripe 1½ inches wide, between top and bottom paints as indicated by the plan. Canvas deck covering to be painted with three coats of deck paint, DeVoe's D tan or equal. The name and port to be put on stern in 3-inch plain block gold leaf letters. All parts of hull where not exposed to view, to be painted with two coats of red lead and oil. Exposed surfaces to be finished properly as hereinbefore mentioned. Other exposed parts of hull, including trimmings, mentioned. Other exposed parts of hull, including trimmings, bridge seats, rails, hatches, decks and companionway, to be finished bright with one coat of wood filler and three coats of the best marine spar varnish, properly applied in the usual manner. All interior mahogany to have egg-shell finished varnish properly applied. Rail stanchions will be enameled a neat approved color, and all flooring to be finished in varnish.

#### Miscellaneous

Deck Chocks: The builder will supply and properly fit th necessary mahogany chocks on forward deck to properly hold service anchor.

Boarding Steps: There will be a pair of regulation mahog-any boarding steps with necessary metal work of brass, to engage sockets on both starboard and port sides, as required. The treads will be covered with corrugated rubber, nosings will be of rubber. There will be the usual white canvas back

trim, as required.

Bilge Pump: There will be an approved hand bilge pump properly fitted as required, to pump all compartments.

| Stations     | 0      | 1      | 2      | 3      | 4      | 5      | 6     | 7      | 8      | 9      | 10     | 11     | 10     |
|--------------|--------|--------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|
| Raised Sheer | 8-5-2  | 8-3-0  | 8-1-0  | 7-11-1 | 7-9-4  | 7-7-7  | 7-6-5 | 6-10-6 | 6-5-7  | 6-4-2  | 6-4-1  | 6-4-2  | 6-4-   |
| Sheer        | 6-11-2 | 6-9-2  | 6-7-8  | 6-5-4  | 6-3-7  | 6-Z-Z  | 6-0-7 | 5-11-6 | 5-10-6 | 5-10-1 | 5-9-7  | 5-10-0 | 5-10-3 |
| Chine        | 4.3-6  | 3-9-7  | 3-5-4  | 3-2-6  | 3-0-0  | 2-10-5 | 2-9-4 | 2-8-6  | 2-8-3  | 2-8-1  | 2-7-7  | 2-7-6  | 2-7-4  |
| But. 1       | 3-8-5  |        | 2-9-0  | 2-3-0  | 1-11-6 | 1-10-3 | 1-9-7 | 1-10-6 | 1-11-0 | 2-0-1  | 2-1-4  | 2-3-0  | 2-4-1  |
| But &        |        |        |        | 2-10-4 | R-6-4  | 2-4-3  | Z-3-Z | 2-3-0  | 2-8-1  | 2-3-6  | 244    | 2-5-4  | 2-6-   |
| But 9        |        |        |        |        | 2-11-6 | 2-9-4  | 2-7-6 | 2-7-0  | 2-6-5  | 2-6-6  | 2-7-0  | 2-7-1  | 2-7-A  |
| Robbet       |        | 2-3-6  | 1-8-6  | 1-6-6  | 1-5-2  | 1-4-6  | 1-5-0 | 1-5-7  | 1-7-2  | 1-9-0  | 1-10-0 | 2-0-7  | 2-3-0  |
| Nee!         |        | 1-10-5 | 1-5-5  | 1-3-2  | Botton | oftoe  | Strai | pht    | 0-6-R  | 1-3-0  | 1-9-4  | 2-0-7  | 2-2-1  |
| Foirbody     | 1-11-6 | 1-8-4  | 1-6-0  | 1-4-4  | 1-3-6  | 1-36   | 1.4.2 | 1-5-1  | 1-6-6  | 1-8-4  | 1-10-3 | 2-0-4  | 2-2-   |
| Maisad Sheer |        | 2-2-2  | 3-4-6  | 4-0-7  | 4-4-7  | 4-6-4  | 4-6-2 | 4-5-0  | 4-2-6  | 3-11-7 | 3-8-0  | 3.3.2  | 2-9-1  |
| W.L.1        |        | 1-7-3  | 2-9-3  | 3-7-0  | 4-1-3  | 4-4-7  | 4-5-6 |        |        |        |        |        |        |
| W.L.R        |        | 1-4-4  | 2-5-6  | 3-3-2  | 3-10-1 | 4-2-4  | 4-4-5 | 44-6   | 4-3-2  | 4-1-0  | 3-9-3  | 3-5-2  | 3-0-   |
| W.L.3        |        | 1-2-5  | 2-3-1  | 3-0-4  | 3-7-3  | 4-0-2  | 4-3-1 | 4-4-3  | 4-4-1  | 4-2-7  | 4-0-4  | 3-9-6  | 3-6-   |
| W.L.4        |        | 1-1-2  | 2-0-6  | 2-9-4  | 3-4-3  | 3-9-2  | 4-0-5 | 4-2-3  | 4-3-1  | 4-2-7  | 4-1-5  | 3-11-6 | 3-8-   |
| 6 L. W.L.    |        | 0-5-0  | 1-3-4  | 2-2-5  | 3-0-3  | 3-4-6  | 3-8-0 | 3-10-0 | 3-10-7 | 3-10-7 | 3-10-2 | 3-9-1  | 3-7-6  |
| Chine        |        | 1-1-0  | 1-11-5 | 2-7-1  | 3-0-3  | 3-4-6  | 3-6-3 | 3.7.4  | 3-7-6  | 3-7-3  | 3-6-5  | 3-5-4  | 3-4-   |
| Robbet       | 4      | 0-1-4  | 0-1-4  |        |        |        |       |        |        | 0-1-4  | 0-2-0  | 2-1-4  |        |
| Diagonal A   |        | 1-10-4 | 3-0-0  | 3-9-4  | 4-3-1  | 4-6-4  | 4-7-6 |        |        |        |        |        |        |
| Diagonal B   |        | 0-11-0 | 1-7-1  | 2-0-3  | 2-3-3  | 2-50   | 2-6-0 | 2-5-7  | 2.5.8  | 2-4-5  | 2-3-3  | 2-R-0  |        |

# The Way We Would Do It

Conducted by F. W. Horenburger and A. E. Snyder

EVERY month MoToR Boating's staff of experts answers thousands of inquiries about boats, engines, accessories and, in fact, everything marine. There is hardly a branch of the sport or industry on which they are not constantly being asked to give their opinions. They are very glad to do this, as well as to be of whatever service they can to MoToR Boating's subscribers and readers.

Quite naturally, many requests for information are received on subjects which are not of universal interest to every motor boatman. This, as well as the fact that it would be a physical impossibility to print answers to all questions received, makes it necessary for us to follow the rule of only printing answers to the few most important and interesting questions. However, we always give a reply by mail, so if you are perplexed about any questions pertaining to boating don't hesitate to write to "The Way We Would Do It" Editor.

During the past season I have had much trouble with faulty ignition and strongly suspect that my magneto has gotten out of proper time. Is there any way in which I can check up the timing? Any information which you can give on the proper functioning of the several parts of the

high tension magneto will be ap-preciated.—B. M., Middletown, Conn. The high tension

magneto is a selfcontained unit for producing the electric sparks used to ignite the charge in the cylinder of the internal combustion engine. The timing of these sparks so that they come at the proper point on the stroke is also included in its functions.

There are a number of dif-

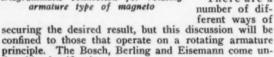


Fig. 1.

Diagrammatic connection for rotating

ARMATURE

der this classification.

ONDENSER

The diagrammatic connections for this type of magneto are shown in Fig. 1. The armature is of the spool type and on it are the primary and secondary windings. The former consists of a comparatively few turns of coarse wire and the latter of a relatively large number of turns of fine wire. The breaker is connected in series with the primary winding and its function is to interrupt the primary current at the proper time. While it is closed, this winding is short-circuited.

Inasmuch as the primary and secondary windings are both carried on the armature they rotate together in the magnetic field formed by the permanent magnets. There is, therefore, a voltage generated in both. For the moment consider the breaker points closed during a complete revolution and no current flowing in the secondary at any time. How will the current in the primary vary during this

The size of the current in the primary at any instant

depends on the voltage which is generated in it, and the voltage depends on the rate at which the windings are cutting the magnetic lines of force. That is, the greatest voltage is generated, and consequently the heaviest current flows when the primary winding is cutting lines of force fastest.

In order to determine when the rate of cutting is greatest, let us consider the armature in various positions of the revolution. When the armature is in the position A, Fig. 2, all the lines of force are passing through the core of the spool, and consequently through the primary winding. When the rotation has progressed to the position C, there are no lines of force passing through the primary coils. In short, between the positions A and C there has been a change from maximum to minimum. As soon as the armature assumes the vertical position B the ends of the spool offer the shortest path for the lines of force, and naturally this is the one taken.

It follows from this that the maximum voltage is generated in the primary coil when the armature is in the vertical position, because lines of force are being cut by the primary winding at the greatest rate. During this revo-

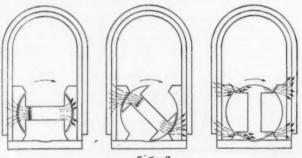


Fig. 2

The magnetic field passes through the armature core and as the core rotates, maximum voltage is generated when the field passes through the ends of spool

lution the breaker has been assumed closed, and the next step is to consider the variations in the current. Of course the current will rise and fall with the voltage in the primary, but it will lag behind somewhat due to what is known as inductance. It is sufficient to say here that the current reaches its maximum value when the armature is a short

distance past the vertical position, the exact amount varying with the design of the magneto. Th

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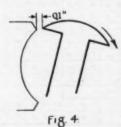
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This is the time to break the primary circuit if the maximum inductive effect is to be obtained in the secondary coil. The sudden drop from a comparatively high current value to zero in the pri-mary produces the high voltage in the secondary that is needed to jump the gap at the spark plug.

The condenser is shunted across the breaker points to prevent damage to the points due to sparking





Position of distributor brush at the instant breaker points separate. The distributor brush and armature should be in positions shown when gears are in mesh



Proper etiquette in flying flags should always be observed

and to increase the rate of current change in the primary. The latter function serves to intensify the spark obtained. The safety spark gap is placed in the secondary circuit so that should no spark jump across the spark plugs there will be one across this gap. If this were not provided the only outlet for the excessive voltage produced in the secondary would be through the insulation in the windings.

With these points thoroughly understood it is easy to comprehend the necessity for the various steps in timing a magneto. For example, take the timing of a Bosch Model

DU-4 1. Remove magneto distributor plate by depressing the two catch springs. This exposes the distributor gear and brush.

2. Remove cover on interrupter housing by swinging holding spring out of the way.

3. Remove hexagonal headed fastening screw holding interrupter.

4. Remove permanent magnets by unscrewing holding

screws at their base. The two magnets should be placed together with ends of opposite polarity in contact. Never let a magnet stand unless it has a piece of steel across its poles. 5. Remove bar connecting distributor with slip ring

6. Remove dust cover assembly complete, including safety spark gap and split-ring brush holder.

7. Take our four screws in plate located at driving end of magneto, and remove this plate.

8. Pull off interrupter mechanism. If this assembly sticks it should be pried off with two small screw-drivers inserted one on each side back of the interrupter disk.

The armature can now be slipped out. 9. The armature can now be supper out.

The magneto is now completely disassembled with. and the timing operation may be proceeded with.

1. Set the distributor brush so that it is about three-quarter way on the segment, as shown in

2. Insert the armature part way and rotate until there is a space of about 0.1 inch between the trailing edge of the armature spool and the pole face, Fig. 4. This is a check on the markings on the timing gears which should be in juxtaposition when the timing is correct. The gears are then meshed by pushing the armature in the rest of the

way.
3. Reassemble the magneto in the reverse order of its disassembly.

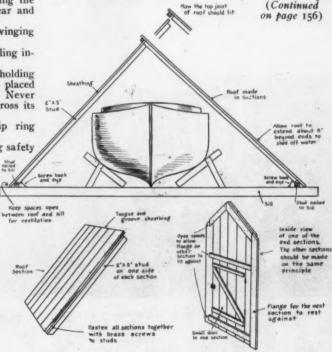
Having recently acquired a small cruiser, I have been told that there are certain formalities to be complied with in the matter of flags. Can you give me some first-hand information as to the proper etiquette on this subject as I do not wish to appear ignorant before my fellow club members?—O. M. B., Phila., Pa.

The yacht ensign is similar to our national emblem, except that on the blue field is a fouled an-chor surrounded by thirteen stars. This, on motor boats, is always flown from the stern-staff. The club flag, a three-cornered affair, is used on the bow-staff. Then there may be the owner's private signal (a swallow-tail flag) and the officer rectan-gular flag. These four flags are "colors." If you have more than two of them, you must have a signal mast, preferably with a yardarm, for there must be but one flag on the bow or stern-staff. The private signal is then run up to the masthead. An officer of a club flies the officer's flag at the mast-head. It is allowable, but not necessary, to fly both of these flags. In this case the officer's flag is flown at the mast-head and the private signal on the starboard yardarm. If cruising with another club, of which the boat owner is a member, but not an officer, his officer's flag should not be used. Don't raise your colors before eight o'clock in the morning or keep them up after sunset. If a naval vessel is in the harbor take your time for colors from it. Or, if you enter a harbor shortly before eight or after sunset, colors should be displayed and taken down

immediately after anchoring. For a salute, dip the ensign once. Don't blow the whistle for this purpose.

Can you offer any suggestions on a suitable way to protect an expensive runabout from the weather during the winter lay-up season? I have quite a stock of lumber on hand which could be used for this purpose. Can you tell me how I can avail myself of this material to build a shelter which can be stored and preserved for use another year?—M. W. T., New London, Conn.

We would suggest that you assemble some studs and boards into sections which can be readily handled until you



Simple method of protecting a boat from the winter's storms



A view of the assembly room showing a number of each of the one, two, four and six cylinder Frisbie "going through"

# American Manufacturers of Two-Cycle Marine Motors

An Alphabetical List of Two-Cycle Marine Motors With the Names and Addresses of Their Manufacturers Giving the Range of Power Produced by Each

| Two-Cycle Marine Motor Manufacturers   | Superior Superior Motor Wks., Jackson, Mich.   |
|--|--|
| Acadla   | Superior Superior Motor Wks., Jackson, Mich. 6, 12 H. P. 1-2 cyls. Toledo Universal Machine Co., Bowling Green, O.   |
| Acadia   | 3, 6, 7, 12 H. P. 1-2 cyls.  Waterman  |
| Barber Barber Bros., King Bros., Successors, Syracuse, N. Y.   | Two-Cycle Outboard Motor Manufacturers   |
| Barker Barker Factory, Norwalk, Conn.  | Aerothrust Aerothrust Engine Co., La Porte, Ind.   |
| Bridgeport Bridgeport Motor Co., Inc., Bridgeport, Conn.   | 3. 5 H. P. 2 cyle.   |
| Brown Talbot Brown Talbot Machinery Co., 10 Oakland St., Salem,  | Amphion Clarence J. Allen, 045 So. Pierce St., Milwaukee, Wis. 4 H. P. 2 cyls.   |
| Mass. 5, 10, 15, 20, 30 H. P. 1-2 cyls. Bud-E The Carlyle Johnson Machine Co., 52 Main St., Man-   | Evinrude Evinrude Motor Co., 279 Walker St., Milwaukee, Wis. 2, 3½ H. P. 1 cyl.  |
| chester, Conn. 5 H. P. 2 cyl. Cady of CanastotaC. N. Cady Co., Inc., Canastota, N. Y.  | Gierholt Gierholt Gas Motor Co., Detroit, Mich.  |
| Caille Caille Perfection Motor Co. Detroit, Mich.  | Gilmore Marine Motor Corp., 404 24th St., Detroit, Mich.   |
| 2½, 4, 6, 8, 14, 20, 30 H. P. 1-4 cyls.  | Joymotor Adams Motor & Mfg. Co., 3914 Costello Ave., Chicago,  |
| 4, 7 H. P. 4 cyls.   | Koban Koban Mfg. Co., 241 South Water St., Milwaukee, Wis.   |
| 21/4, 4, 6, 8, 14, 20, 30 H. P. 1-4 cyls.  | L. A Lockwood-Ash Motor Co., Jackson, Mich.  |
| a) 4 11. 1 . 1 - a cyts.   | Motorgo Sears, Roebuck & Co., 925 Homan Ave., Chicago, Ill.  |
| Foreman Foreman Motor & Mach. Co., Ltd., Toronto, Can. 12 H. P. 2 cyls.  | Amphion. Clarence J. Allen, 645 So. Pierce St., Milwaukee, Wis. 4 H. P. 2 cyls.  Evinrude Evinrude Motor Co., 279 Walker St., Milwaukee, Wis. 2, 334 H. P. 1 cyl.  Glerholt. Gierholt Gas Motor Co., Detroit, Mich. 2 H. P. 1 cyl.  Gilmore Marine Motor Corp., 404 24th St., Detroit, Mich. 2 H. P. 1 cyl.  Joymotor. Adams Motor & Mfg. Co., 3914 Costello Ave., Chicago, Ill.  Koban. Koban Mfg. Co., 241 South Water St., Milwaukee, Wis. 3 H. P. 2 cyl.  L. A Lockwood-Ash Motor Co., Jackson, Mich. 2 H. P. 1 cyl.  Motorgo. Sears, Roebuck & Co., 925 Homan Ave., Chicago, Ill. 2 H. P. 1 cyl.  Wisconsin Machinery & Mfg. Co., Milwaukee, Wis. 2, 334 H. P. 1 cyl. |
| Frazer Adams Frazer Bros. Co., Adams, N. Y.<br>2, 4, 5, 10 H. P. 1-2 cyls.   | 2, 31/4 H. P. 1 cyl.   |
| Gilmore  | Two-Cycle Heavy Oil Motor Manufacturers  |
| Gray Gray Motor Co., 2108 Mack Ave., Detroit, Mich.  | Bolinders Co., 30 Church St., New York, N. Y.  |
| Foreman  | Two-Cycle Heavy Oil Motor Manufacturers  |
| H. L. B. H. L. Brownback Co., Norristown, Pa.  | 650, 975, 1100, 1650, 1800, 3000 H. P. 4-6 cyls.   |
| 3 H. P. 1 cyl.  Hartford   | 30, 45, 60, 75, 100, 150, 200, 300 H. P. 2-6 cyls.   |
| Imperial   | 10, 14, 30, 45, 60, 90, 125, 180, 240 H. P. 2-6 cyls.  |
| S   S   S   S   S   S   S   S   S   S  | Kahlenberg Kahlenberg Bros. Co., Two Rivers, Wis. 36, 54, 60, 70, 90, 120 H. P. 2-4 cyls.  |
|  | Lazier Lazier Gas Engine Co., 190 Main St., Buffalo, N. Y. 50, 100, 150, 200, 300 H. P. 1-6 cyls.  |
|  | Mianus The Mianus Motor Works, Stamford, Conn. 734, 15, 30, 45, 60 H. P. 1-4 cyls.   |
| LathropJ. W. Lathrop Co., Mystic, Conn.  | Mietz  |
| L-A Lockwood Ash Motor Co., Jackson, Mich.   | Missouri Missouri Engine Co., 2806 N. 11th St., St. Louis, Mo.   |
| Antos. Camden Anchor Rockland Machine Co., Camden, Me. 3, 434, 536, 6, 734, 9, 11, 15 H. P. 1-2 cyls.  Lathrop. J. W. Lathrop Co., Mystic, Conm. 3, 4, 5, 6, 7, 8, 10, 12, 14, 16, 29, 24, 36 H. P. 1-3 cyls.  L-A. Lockwood Ash Motor Co., Jackson, Mich. 23/5, 4, 6, 8 H. P. 1-2 cyls.  L. & D. Motor Wks., 75 Prospect Ave., Hartford, Conn.  | Nordberg Nordberg Mfg. Co., Milwaukee, Wis.  |
| Mianus Mianus Motor Wks., Stamford, Conn.  | Remington  |
| 3, 5, 6, 71/2, 10, 15, 20 H. P. 1-2 cyls.  Motorgo Sears, Roebuck & Co., 925 Homan Ave., Chicago, Ill.   | 7, 10, 11, 14, 17, 22, 23, 24, 32, 34, 35, 37, 46, 55, 75 H.P.<br>1-4 cyls.  |
| 3 H. P. 1 cyl.  Mianus. Mianus Motor Wks., Stamford, Conn. 3, 5, 6, 7½, 10, 15, 20 H. P. 1-2 cyls.  Motorgo. Sears, Roebuck & Co., 925 Homan Ave., Chicago, Ill. 2½, 4, 6, 8 H. P. 1-2 cyls.  Mohawk. S. R. Mig. Co., Schenectady, N. Y. 3½, 5, 6, 7, 10, 12, 16, 18, 21, 25, 30 H. P. 1-4 cyls.  Ontario. A. E. Olmstead & Sons, Pulaski, N. Y. 2, 2, 6, 7, 9, 12, 14, 21, 28, H. P. 1, 4 cyls. | Skandia Skandia Pacific Oil Engine Co., Oakland, Cal. 9, 16, 24, 38, 55, 70, 120, 140, 180, 240, 350, 500 H. P.  |
| 3½, 5, 6, 7, 10, 12, 16, 18, 21, 25, 30 H. P. 1-4 cyls.<br>Ontario   | Venn Severin Venn Severin Machine Co., 1317 W. North Ave., Chicago.  |
| 2, 3, 6, 7, 9, 12, 14, 21, 28 H. P. 1-4 cyls. Palmer Bros. Engines, Inc., Cos Cob, Conn.   | III.   |
| 2½, 4, 5, 6, 7½, 10 H. P. 1-2 cyls.  | 10, 20, 25, 40, 45, 70, 100, 150, 200 H. P. 1-4 cyla.<br>Weiss Engine Co., 17 Battery Place, New York, N. Y.<br>45, 60, 75, 120, 150, 200, 225, 300, 400 H. P. 3-4 cyls.   |
| A. E. Olimitead & Sons, Pulsatis, N. P. 1-4 cyls.  | Steam Plant Manufacturers  |
| Mass. 134, 3, 6, 8, 12, 16, 18, 24 H. P. 1-3 cyls.   | Talbot   |
| 4, 16 H. P. 1-4 cyls.  | way, N. Y. 15, 25, 50, 100, 200, 300, 400, 600, 1000, 2000 H. P.   |
| St. Lawrence St. Lawrence Eng. Co., Ltd., Brockville, Ont. 3, 4, 6, 8, 12, 18 H. P. 1-3 cyls.  | 13, 25, 30, 100, 200, 300, 400, 600, 1000, 2000 H. P.<br>2-4 cyls.   |

Two-Cycle Marine Motors for 1921

The initials used in the column headed Ignition indicate the standard equipment supplied, and have the following meanings: B—Battery Ignition: B. & M.—System using both battery and coll with magnete; M. & B.—Make and break system with either batteries or low tension magnete; J. 5.—Jump spark battery and coll system; M.—High tension magnete: Opt.—Purchaser has the option of make and break or jump spark system

| Two-Cycle Motors | Under 5 | Horsepower |
|------------------|---------|------------|
| 2 or 3           | Rated   | Ne         |

|                |                       |       |                              | 1             | wo-c                 | yese 1 | 1101013          |                | 3 110/sepowe             |                 |                          |               |                   |        |                     |
|----------------|-----------------------|-------|------------------------------|---------------|----------------------|--------|------------------|----------------|--------------------------|-----------------|--------------------------|---------------|-------------------|--------|---------------------|
| Rated<br>H. P. | Motor<br>Barker       | Cyla. | Bore &<br>Stroke<br>3 &x31/2 | R.P.M.<br>550 | Wt.<br>110           | Port 2 | Ignition<br>Opt. | Rated<br>H. P. | Motor<br>Mianus          | No. of<br>Cyla. | Bore &<br>Stroke<br>4 x4 | R.P.M.<br>550 | Wt.<br>195        | Port 2 | Ignition<br>M. & B. |
| 13%            | Rex<br>Evinrude       | 1     | 253x253                      | 700<br>800    | 55<br>73<br>38<br>87 | 2      | I. S.            | 3              | Ontario<br>Rex           | . I             | 314x314                  | 900<br>700    | 150               | 3      | 1. S.               |
| 2              | Gilmore               | 1     | 3 x234                       | 800           | 28                   | 3      | J. S.            | 1 3            | St. Lawrence             | î               | 217-212                  | 900           | 100               | 3      | 1. 8.               |
| 2              | Frazer Adams          | î     | 3 nx3                        | 900           | 87                   | 3      | 1. S.            | 3              |                          | 1               | 434×4                    |               | 205<br>140        |        | M. & B.             |
| 2              | Ontario               | 1     | 2%x3                         | 1,200         | 60                   | 3      | ]. s.<br>]. s.   | 3              | Snapper<br>Toledo        | 1               | 336x336                  | 750           | 140               | 2      | J. S.               |
| 21/2           | American              | 1     | 314x314                      | 800           | 140<br>75            | 2      | I. S.            | 3              | Waterman                 | 1               | 2%(x3                    | 1,000<br>700  | 68<br>175<br>145  | 3      | Opt.                |
| 214            | Barber                | 1     | 314x314                      | 750           | 75                   | 3      | J. S.            | 314            | Guarantee                | 1               | 374 x374                 | 900           | 175               | 2      | J. S.               |
| 21/2           | Barker<br>Caille      | 1     | 436×436                      | 450<br>800    | 170<br>140           | 2.     | Opt.<br>J. S.    | 339            | Mohawk<br>Acadia         | 1               | 399x394                  | 650           | 165               |        | M. & B              |
| 712            | L-A                   | - 1   | 312 × 312                    | 750           | 165                  | 2      | Opt.             | 1 2            | American                 | i               | 374×334                  | 800           | 165<br>150        | . 2    | I. S.               |
| 914            | Motorgo               | î     | 314×314                      | 750           | 165<br>97            | 2      | B.               | 4              | Barber                   | î               | 4 14                     | 600           | 150               | 3      | 1. S.               |
| 214            | Palmer                | i     | 3%×334                       | 500           | 135                  | 3      | J. S.            | 4              | Barker                   | 1               | 4 4x5                    | 400           | 150<br>220        | 2      | Opt.                |
| 234            | Waterman              | 1     | 2%x3                         | 800           | 36                   | 3      | M                | 4              | Cady of Canastoti        | 1               | 456x4                    | 700<br>800    | 160<br>150<br>230 | 3      | В.                  |
| 3              | Acadia                | 1     | 4 x334                       | 550           | 150                  | 2      | M. & B.          | 4              | Caille                   | 1               | 376x336                  | 800           | 150               | . 2    | J. S                |
| 3              | Cady of Canastota     | 1     | 356×354                      | 700           | 140                  | - 3    | В.               | 4              | Easthope                 | 1               | 3%x5<br>256x236          | 650           | 230               | H      | J. S.               |
| 3              | Capital               | 1     | 314x314                      | 800<br>550    | 120<br>281           | 3      | J. S.<br>M. & B. | 1 2            | Evinrude<br>Frazer Adams | 2 2             | 34x3                     | 1,150         | 68<br>158         | 2      | M.                  |
| 3              | Greenport<br>H. L. B. | 1     | 334x3                        | 800           | 80                   | 3      | I. S.            | 1 2            | Gilmore                  | 2               | 3 x236                   | 800           | 68                | 3      | 4. 8.               |
| 3              | Kahlenberg            | 1     | 334x334                      | 600           | 125                  | 2      | M. & B.          | 4              | Gray                     | ĩ               | 314x314                  | 800           | 150               | 3      | i.s.                |
| 3              | Knox                  | î     | 4 x4                         | 600           | 200                  |        | Opt.             | 4              | Greenport                | ĩ               | 454×5                    | 500           | 150<br>381        | 2      | M. & B.             |
| 3              | Lathrop               | · 1   | 4 x4                         | 500           |                      |        | Opt.             | 4              | Imperial                 | 1               | 4 x834                   | 500           | 220               | 3      | J. S.               |
| 3              | L. & D.               | 1     | 334x4                        | 900           | 98                   | 2      | J. S.            | 11 4           | Kahlenberg               | 1               | 4 x4                     | 550           | 160               | 2      | M. & B.             |

### Two-Cycle Marine Motors for 1921—(Continued)

|    | Motor<br>Lathrop<br>L-A<br>Motorgo | No. of<br>Cyls. | Bore & Stroke 4½x5 4 x4 4 x4     | R.P.M.<br>500<br>750<br>750 | Wt.<br>203<br>135 | Port 2 2 2 2 2 2 | Ignition<br>Opt.<br>Opt.<br>B.<br>M. & B. | 10       | Motor<br>Mohawk<br>Palmer<br>Knox | No. of Cyls.     | Bore &<br>Stroke<br>4½x4½<br>4½x4½<br>5¼x5¼                  | R.P.M.<br>500<br>650<br>525 | Wt.<br>510<br>325<br>575 | Port<br>Opt.   | Opt<br>J. S<br>Opt |
|----|------------------------------------|-----------------|----------------------------------|-----------------------------|-------------------|------------------|---|----------|-----------------------------------|------------------|--|-----------------------------|--------------------------|----------------|--------------------|
|    | Palmer<br>Palmer                   | 1               | 436x436<br>436x436               | 450<br>475                  | 240<br>220        | 3                | J. S.                                     |          | 12 to 20                          | Horse            | bower T  | wo-Cy                       | cle M                    | lotors         |                    |
|    | Roberts<br>St. Lawrence            | 1               | 316x4<br>316x4                   | 1,000<br>900                | 122<br>110        | 3                | Opt.<br>J. S.<br>M. & B.                  | Rated    |                                   | No. of           | Bore &   |                             |                          | 2 or 3         | **                 |
|    | Bridgeport<br>Knox                 | 1               | 436x5<br>436x436                 | 500<br>550                  | 300<br>250        |                  | M. & B.<br>Opt.                           | H. P.    | Motor<br>Barber                   | Cyls.            | Stroke<br>61/2x61/4  | R.P.M.<br>500               | Wt.<br>400               | Port 3         | J. S               |
|    |                                    |                 |                                  |                             | 1. 1/-            | Anna             |   | 12       | Barber<br>Barber                  | 2 3              | 434 x 434<br>4 x 4   | 600<br>600                  | 375                      | 3              | ]. S               |
| đ  | 5 to 8 Ho                          |                 | Bore &                           | wo-cyt                      | ie Mo             | 2 or 3           | -   | 12       | Bridgeport<br>Capital             | 2 2              | 514x514<br>41/2x51/2   | 500<br>800                  | 550<br>420               | · 3            | M.<br>J. S         |
| 3  | Motor                              | Cyla.           | Stroke                           | R.P.M.                      | Wt.               | Port             | Ignition                                  | 12       | Foreman<br>Greenport              | 2 2              | 434×434  | 800<br>450                  | 375<br>804               | 3 2            | B.<br>M.           |
|    | Acadia<br>Acadia                   | 1               | 4 x4<br>434x5                    | 750<br>550                  | 165<br>300        | 2 2              | J. S.<br>M. & B.                          | 12       | Kahlenberg                        | 1                | 534x6<br>634x7   | 350                         | 750                      | 2 2            | M.                 |
|    | Barber<br>Brown Talbot             | 1               | 334 x334<br>4 x4                 | 750<br>750                  | 150<br>200        | 3 2              | J. S.<br>J. S.<br>M.                      |          | Kahlenberg<br>Lathrop             | 2                | 5 x5<br>7½x7½  | 400<br>275                  | 650                      | 2              | M.<br>Opt          |
|    | Bud E<br>Frager Adams              | 2               | 3 x3<br>3%x434                   | 1,200                       | 110<br>182        | 3                | M.<br>J. S.                               |          | Lathrop<br>Lathrop                | 2 2              | 534x5<br>534x634   | 400                         |                          | 2 2            | Opt                |
|    | Greenport<br>Guarantee             | 1               | 5 x536                           | 475<br>600                  | 450               | 3 2 2            | M. & B.<br>J. S.                          | 12<br>12 | Mianus<br>Mohawk                  | 2 2              | 4%x5<br>4%x3%  | 700<br>1,200                | 575<br>220               | Opt.           | J. S               |
|    | Hartford                           | 1               | 436x436<br>4 x436                | 700<br>500                  | 230<br>280        | 2 3              | M. & B.                                   | 12       | Mohawk<br>Ontario                 | 2 4              | 436x436<br>336x336   | 700<br>900                  | 400<br>300               | Opt.           | Opt<br>J. S        |
|    | Imperial<br>Lathrop                | i               | 435x4<br>5 4x5                   | 500                         |                   | 2 2              | J. S.<br>Opt.                             | 12       | Superior                          | 2 2              | 436x4<br>4 x436  | 800<br>900                  | 393                      | 2 3            | 1. 8               |
|    | Mianus<br>Mohawk                   | 1               | 436x436                          | 500<br>500                  | 335<br>310        | Opt.             | M. & B.<br>Opt.                           | 12       | St. Lawrence<br>St. Lawrence      | 3                | 31/2x4   | 900<br>750                  | 300<br>350               | 3              | J. S.<br>Opt       |
|    | Palmer<br>Snapper                  | 1               | 3% x339<br>534 x5                | 700                         | 180<br>340        | 3 2              | J. S.<br>M. & B.                          |          | Toledo<br>Acadia                  | 2<br>2<br>2<br>2 | 436x436<br>536x5   | 700                         | 450                      | 2 2            | M.                 |
|    | Gray<br>Knox                       | 1               | 6 x534                           | 1,100<br>525                | 170<br>330        | 3                | J. S.<br>Opt.                             |          | American<br>Caille                | 2                | 534x5<br>434x434<br>434x434                                  | 800<br>800                  | 350<br>350               | 2 2            | 1. 5               |
|    | American<br>Barber                 | 1               | 496 x 436<br>436 x 436           | 800<br>600                  | 200<br>245        | 2 3              | J. S.<br>J. S.                            | 14<br>14 | Lathrop<br>Ontario                | 2 2              | 6 x632<br>5 x5   | 400<br>600                  | 500                      | 3              | J. S               |
|    | Bridgeport<br>Cady of Canastots    | i               | 514x514                          | 500<br>700                  | 350<br>190        | 3                | M. & B.<br>B.                             | 15<br>15 | Acadia<br>Brown Talbot            | 3                | 4 x4<br>7 x634   | 800<br>350                  | 400<br>600               | 2 2            | 1. 5               |
|    | Caille                             | 1               | 3%x3%<br>4%x436                  | 800<br>600                  | 200<br>285        | 2 3              | J. S.                                     | 15<br>15 | Capital<br>Greenport              | 3 2              | 31/4x31/4  | 1,200<br>400                | 220<br>1,025             | 3 2            | J. S.              |
|    | Capital<br>Foreman                 | 2               | 4½x5½<br>3½x3½                   | 800                         | 220               | 3                | J. S.<br>B.                               | 15       | Imperial<br>Kahlenberg            | 3                | 435×4  | 500<br>325                  | 500<br>900               | 3 2            | J. S<br>M.         |
|    | Greenport<br>Greenport             | 1 2             | 535x6<br>4 x4                    | 450<br>550                  | 529<br>431        | 2 2              | M. & B.<br>M. & B.                        | 15<br>15 | Knox                              | 2 2              | 53/5×63/4<br>5 14×6  | 500<br>450                  | 700<br>875               | 2              | Opt<br>M.          |
|    | Kahlenberg<br>Knox                 | 2               | 5 x5<br>4 x4                     | 400<br>600                  | 400<br>340        | 2                | M. & B.<br>Opt.                           | 15<br>15 | Mianus<br>Pierce-Budd             | 2 2              | 4 x4<br>534x6  | 1,600                       | 170                      | Opt.           | J. S               |
|    | L-A<br>Lathrop                     | 1               | 314x314<br>514x5                 | 750<br>500                  | 225               | 2 2              | Opt.<br>Opt.                              | 16<br>16 | Acadia<br>Kahlenberg              | 2 2              |  | 500<br>380                  | 650<br>950               | 2 2            | M.                 |
|    | Lathrop                            | 1               | 534×634<br>454×5                 | 400<br>700                  | 335               | . 2              | Opt.                                      | 16<br>16 | Lathrop<br>Mohawk                 | 2                | 634x634<br>434x434<br>334x4<br>534x534<br>434x434<br>434x534 | 400<br>900                  | 395                      | Opt.           | Op                 |
|    | Mianus<br>Mohawk                   | 2               | 4 x4<br>4½x3¾                    | 550<br>1,200                | 355<br>155        | Opt.             | J. S.<br>M. & B.<br>Opt.                  | 16<br>18 | Roberts<br>Barber                 | 4<br>2<br>3      | 334x4<br>534x534   | 1,000<br>550                | 265<br>535               | à              | J. S               |
|    | Mohawk                             | ,î              | 436x436                          | 700<br>750                  | 275<br>154        | Opt.             | Opt.<br>B.                                | 18<br>18 | Barber<br>Capital                 | 3                | 434×434  | 600<br>800                  | 500<br>530               | 3              | }                  |
|    | Motorgo<br>Ontario                 | . 2             | 314x314<br>314x314               | 900                         | 230               | 3                | J. S.<br>M. & B.                          | 18       | Mohawk                            | 3                | #73A#73  | 700                         | 510                      | Opt.           | Op<br>Op           |
|    | Palmer<br>Pierce-Budd              | 1               | 5 x6<br>4 x4                     | 400<br>1,500                | 350<br>125        | Opt.             | M. & B.<br>A. K.                          | 18<br>20 | St. Lawrence<br>American          | 3 2              | 4 x43/2<br>53/4x5  | 600                         | 495                      | 2 2            | 1. 3               |
|    | Rex<br>St. Lawrence                | 1 2             | 436x5<br>334x336                 | 600<br>900                  | 310<br>160        | 3                | J. S.<br>J. S.                            | 20<br>20 | Brown Talbot<br>Caille            | 2 2              | 51/2×5<br>51/4×5   | 500<br>600                  | 450<br>495               | 2              | }:                 |
|    | Superior<br>Toledo                 | 1               | 436x4<br>436x436                 | 800<br>750                  | 293<br>200        | - 2              | J. S.<br>J. S.<br>Opt.                    | 20<br>20 | Capital<br>Capital                | 2                | 4½x4¼<br>3½x3¼   | 1,200<br>1,200              | 250<br>250               | 3              | }.                 |
|    | Waterman<br>Waterman               | 1 2             | 4 x4                             | 600<br>800                  | 111               | 3                | B.<br>M.                                  | 20<br>20 | Emerson<br>Hartford               | 2                | 5 x5<br>5 x534   | 700                         | 342<br>440               | 3 2            | M.                 |
|    | Acadia<br>Barker                   | 1               | 2%x3<br>5½x5<br>5½x6½            | 700<br>350                  | 300<br>350        | 2 2              | M. & B.<br>Opt.                           | 20<br>20 | Imperial<br>Lathrop               | 2 2              | 51/2×6<br>7 ×71/2  | 500<br>300                  | 825                      | 3 2            | J. S               |
|    | Capital<br>Easthope                | i               | 435×434<br>6 ×7                  | 800<br>450                  | 160<br>909        | 3                | J. S.<br>A. K.                            | 20       | Mianus                            | 2                | 63/2×7   | 375                         | 1,390                    | 2              | M.                 |
|    | Gilmore                            | 3               | 3 x234                           | 800                         | 92                | 3                | J. S.                                     |          | Two-Cy                            | cle Mo           | tors Ov  | er 20 1                     | Horse                    | power          |                    |
|    | Lathrop<br>Mohawk                  | 1               | 6 x634<br>434x434                | 375<br>900                  | 275               | Opt.             | Opt.                                      | Rated    |                                   | No. o            | f Bore &   | R.P.M.                      |                          | 2 or 3<br>Port |                    |
|    | Mohawk<br>Ontario                  | 2               | 3½x3¾<br>5 x5                    | 900<br>450                  | 215<br>340        | Opt.             | J. S.                                     | H. P.    | Motor<br>Mohawk                   | 3                | Stroke 41/4×33/4   | 1,200                       | 290                      | Opt.           | Op                 |
|    | Toledo<br>Guarantee                | 2               | 3½x3½<br>5 x5                    | 750<br>500                  | 200<br>500        | 3 2 2 2          | Opt.<br>J. S.                             | 21<br>24 | Ontario<br>Acadia                 | 3                | 5 x5<br>514x6  | 600<br>500                  | 740<br>900               | 3 2            | 1.                 |
|    | Mianus<br>Knox                     | 1               | 5 16 x 6 14                      | 450<br>500                  | 490<br>425        |                  | M. & B.<br>Opt.                           | 24<br>24 | Barber<br>Kahlenberg              | 2 2              | 634x634<br>634x7   | 500<br>350                  | 1,300                    | 3 2            | J.<br>M.           |
|    | Palmer                             | î               | 6 x6                             | 400                         | 375               | 2                | M. & B.                                   | 24<br>25 | Lathrop<br>Mohawk                 | 2                | 736x736<br>436x436   | 275<br>700                  | 775                      | Opt.           | Op<br>Op           |
|    | 8 to 11 H                          | orse            | power !                          | Two-Cy                      | ycle M            | lotors           |   | 25<br>27 | Pierce-Budd<br>Barber             | 3                | 4 x4<br>51/4x51/4  | 1,800<br>550                | 240<br>675               | Opt.           | J:                 |
| ed |                                    | No. o           | of Bore &                        |                             |                   | 2 or 3           |   | 28       | Ontario<br>American               | 4                | 5 x5<br>4%x436   | 600<br>1,000                | 990<br>600               | 3 2            | }:                 |
|    | Acadia                             | 1               | 5½x6                             | R.P.M<br>600                | 390               | Port 2 2         | J. S.<br>M. & B.                          | 30       | Brown Talbot                      | 2                | 7 x634<br>434 x434   | 350<br>1,000                | 1,000                    | 2 2            | j:                 |
|    | Acadia<br>American                 | 2               | 4 x4<br>534x5                    | 650<br>500                  | 285<br>335        | 2                | J. S.                                     | 30       | Caille<br>Imperial                | 3                | 534x6  | 500                         | 1,100                    | 3              | j.<br>Op           |
|    | American<br>Barber                 | 2 2             | 336x344                          | 800<br>600                  | 280<br>270        | 3                | ]. S.<br>]. S.<br>]. S.                   | 36       | Mohawk<br>Barber                  | 3                | 434x434<br>634x634<br>734x8                                  | 1,200<br>500                | 925                      | Opt.           | J.<br>M.           |
|    | Barber<br>Barker                   | 3 2             | 4 x4<br>334x334<br>47x5<br>434x4 | 750<br>400                  | 190<br>380        | 3 2 3            | J. S.<br>M. & B.                          | 36       | Kahlenberg<br>Kahlenberg          | 2 3              | 636x7  | 325<br>325                  | 2,000<br>1,700           | 2 2 2          | M.                 |
|    | Cady of Canastot                   | a 2             | 456×4                            | 700<br>500                  | 240<br>335        | 3                | B.<br>J. S.                               | 36<br>40 | Lathrop<br>Barber                 | 3 2              | 732×734<br>8 ×8  | 275<br>350                  | 1,950                    | 3              | J.<br>J.           |
|    | Caille<br>Gray                     | 2 2             | 514 x5<br>314 x314<br>314 x314   | 800<br>800                  | 280<br>275        | 2 2              | T. S.                                     | 40       | Emerson<br>Pierce-Budd            | 4                | 5 x5<br>4 x4   | 1,250<br>1,800              | 532<br>300               | 3              | M                  |
|    | Greenport                          | 1               | 6 x634                           | 400                         | 579               | 3 2 2            | J. S.<br>M. & B.                          | 45       | Emerson                           | 4                | 5 x5<br>7 x8   | 1,850<br>325                | 250<br>2,600             | 3 2            | J.<br>M.           |
|    | Greenport<br>Hartford              | 2               | 456×5<br>436×436                 | 500<br>700                  | 525<br>240        | 2                | M. & B.<br>M. & B.                        | 45<br>54 | Kahlenberg<br>Kahlenberg          | 3                | 734×8  | 325                         | 2,800                    | 2              | M                  |
|    | Kahlenberg<br>Kahlenberg           | 1<br>2<br>1     | 532x6<br>4 x4                    | 400<br>550                  | 550<br>350        | 2 2              | M. & B.<br>M. & B.                        | 55       | Kahlenberg<br>Barber              | 3                | 9 x10<br>8 x8  | 300<br>350                  | 3,400<br>2,850           | 3              | J.                 |
|    | Lathrop<br>L-A                     | 1 2             | 63%x634                          | 375<br>750                  | 305               | 2 2              | Opt.                                      | 60       | Pierce-Budd<br>Emerson            | 6                | 4 x4<br>5 x5   | 2,000<br>1,850              | 450<br>300               | 3              | J.<br>M            |
|    | Motorgo<br>St. Lawrence            | 2 2 2           | 4 x4                             | 750<br>900                  | 222<br>190        | 2 3              | В.  | 85       | Kahlenberg                        | 3                | 9 x10  | 300                         | 5,000                    | 2              | M                  |
|    | Barber                             | 1               | 314x4<br>514x514<br>414x5        | 550                         | 270               | 3                | Opt.<br>J. S.<br>M. & B.                  |          | D                                 | etachab          | le Outb  | oard A                      | Iotor.                   | S              |                    |
|    | Bridgeport<br>Knox                 | 2               | 434 x439                         | 550                         | - 450<br>380      |                  | Opt.                                      | Rated    | 2 or 4                            | No.              | of Bore &  | D D M                       | . Wt.                    | Ports o        |                    |
|    | Ontario<br>Acadia                  | 3 2             | 31/4x31/4<br>41/4x5              | 550                         | 320<br>450        | 3 2 2            | M. & B.                                   | H. P.    | Cycle Moto                        | le 1             | 254 x21/4<br>234 x21/4                                       | R.P.M<br>800                | 73                       | 2              | M                  |
|    | Acadia<br>Barker                   | 2 2             | 4 x4<br>636x8                    | 750<br>350                  | 285<br>510        | 2 2              | J. S.<br>M. & B.                          | 2        | 2 Gierholt                        | 1                | 256 + 216  | . 26,000                    | 59<br>50                 | 2              | I.<br>M            |
|    | Brown Talbot<br>Brown Talbos       | 1               | 534x5                            | 500<br>750                  | 350<br>300        | 2 2 2            | J. S.<br>J. S.                            | 2 2      | 2 Joymot                          | or 1             | 2%x3<br>2%x21/<br>2%x21/<br>2%x21/                           | 850<br>800                  | 85<br>70                 | 3              | M                  |
|    | Capital                            | 2 2             | 334×334                          | 1,200                       | 160               | 3                | j. s.                                     | 2 2      | 2 Motorg                          | 0 1              | 234x234  | 850<br>700                  | 70                       | 2 2            | M<br>B             |
|    | Emerson<br>Frazer Adams            | 1 2             | 5 x5<br>3%x43/                   | 1,250                       | 55<br>262         | 3 3              | ]. S.<br>]. S.<br>]. S.                   | 3        | 2 Wiscon<br>2 Aerothr             | ust 1            | 2%x2%<br>2%x2%<br>2%x3<br>2%x2%                              | 1,600                       | 85<br>67                 | 2              | J.<br>M            |
|    | Gilmore<br>Greenport               | 4 2             | 3 x23/<br>5 x53/                 | 800<br>475                  | 127<br>625        | 2                | M. & B.                                   | 3        | 4 Airdriv<br>2 Koban              | 2                | 2%x2%  | 1,800                       | 86                       | 2              | M                  |
|    | Hartford<br>Imperial               | 1               | 5 x53<br>534x6                   | 500                         | 310<br>420        | 2 3              | M. & B.                                   | 314      | 2 Evinrue<br>2 Wiscon             | un 1             | 314x314  |                             | 116<br>100               | 2              | M                  |
|    | Imperial                           | 2               |                                  | 500                         | 825               | 3                | }. S.                                     | 4        | 4 Evinrue                         | le 2             | 214x214  | 750                         | 96                       |                | M                  |
|    | Lathrop                            | 1               | 634x7                            | 300                         | 815               | 2                | Opt.                                      | 4        | 2 Amphic                          | n 2<br>ust 2     | 234x234<br>3 x334  | 1,200<br>1,300              | 80<br>125                |                | I.                 |

# A Year's Progress in Marine Motors

Marine Manufacturers Keep Pace With the Demand For Improvements in High Grade Motors

By F. W. Horenburger .

URING the past year many steps forward have been taken by all the leading marine motor manufacturers. The principal demand for improvement has been for some form of vaporizing device to enable motors to operate successfully and efficiently on the low grade fuels which are now so prevalent. All up-to-the-minute manufacturers have taken cognizance of this need and many are the devices produced to meet it.

One of the most prominent motor manufacturers is equipping his



J.V.B.odies a nove clutch control novel

fective vaporization of low grade fuels. One of the main causes of poor operation has always been the condensation of fuel particles on the relatively cool manifold walls. This fault is particularly troublesome at low speeds when the gas velocities are low. Solid slugs of rich mixture are drawn into the manifold and cylinders and poor firing is the natural result. The saturated mixture fed to the cylinders is also responsible for much of the spark plug fouling, One of the most annoying features of this poor fuel is the dilution of the lubricating oil which inevitably occurs. This is caused by condensate from the fuel mixture getting past the pistons into the crankcase where it contaminates the lubricant and destroys its viscosity. The result from the lubricant and destroys its viscosity. The result from this is that bearings are burned and cylinder walls scored.

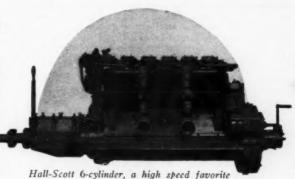
Many suggestions have been offered to remedy these difficulties, among them electrical and hot water heating devices on the carbureter and manifolds. Electrical dedevices on the carbureter and manifolds. vices have proved impractical on account of the drain on the battery, and hot water or other devices depending on the heat from the exhaust are also deficient since the greatest heat is required when the engine is running throttled down and it is at this time that the heat produced by the motor is at a minimum.

The new device referred to previously draws a small amount of fuel from a small carbureter adjacent to the main one. This gas is passed through a special burner and

ignited by means of a spark The heat from this flame, which resembles a bunsen burner, heats the distribution point in the manifold with the result that the mixture inside the manifold is thoroughly warmed and combustible. At low throttle speeds this arrangement is particularly effective and practical. At higher speeds it is not so essential on account of the greater gas velocity through the manifolds. This development is perhaps typical of the advance along this line and shows that the manufacturer is doing what he can to remedy the fuel situation. Another prominent manufacturer has made improvements in the oiling system used on his product. contained in a readily accessible double gear pump. One set of gears pumps the oil from the crankcase to an oilcooling tank separate from the engine. This tank holds a large quantity of oil kept at a low temperature by copper cooling coils through which the cooling water passes on its way from the water intake to the motor. The other set of gears in this pump draws the oil from the cooling tank and forces it under high pressure through the hollow crankshaft from which it is distributed by suitable ducts to the various bearings. Oil is also distributed to the cam shaft under pressure and allowed to drain back naturally to the crankcase. It is largely on account of a well designed oiling system that the modern high speed marine motors are enabled to keep in operation for many hours at a time

without showing any signs of distress.

Much attention is being paid to the balance of reciprocating parts. Crankshafts in particular come in for atten-

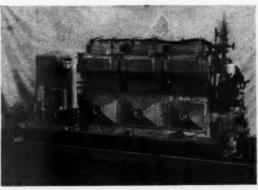


tion in this direction. Four-cylinder motors are enabled to operate at high speeds with no periodic vibration which

would surely be the case if any unequal distribution of weights existed. Special alloy steels are being used in greater volume than ever before. Heat treatment of metals is to-day an exact science. The electric furnace and the oil-fired furnace with

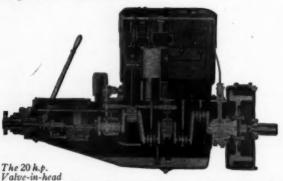
thermostatic temperature control enable the operator to apply the exact amount of heat to the parts and maintain the required temperatures to a nicety. Methods to-day are different from the days when the operator's personal skill was entirely responsible for the successful treating of metals.

Not alone are special steels used but cast iron for the cylinder walls must have certain well established physical properties. The fact that it is cast iron is not sufficient. vital points are, what is the carbon content? How much sulphur, how much phosphorus, how much manganese? The physical properties of cast iron can be varied from a soft gray variety to a hard white variety with no other difference than varying proportions the constituent elements. The modern manufacturer specifies exactly what percentage of each he requires for his castings with the result



The latest model Winton gasoline motor

that he has few failures to explain later. Where particular lightness is an essential, as in racing machines, etc., aluminum alloys are used for pistons. This metal was experimented with extensively during the war and it is possible to-day to alloy aluminum with other elements and produce perfect castings with the strength of steel and the light weight of the aluminum.



Knox will be shown for the first time at the coming show

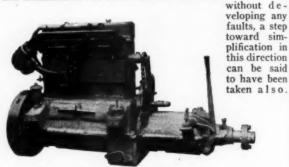
Other makers are producing new models of medium power ranges for which there is the greatest demand. An entirely new motor which is to be unveiled at the coming Motor Boat Show at Grand Central Palace incorporates many of the most advanced ideas in marine engineering. For example, the cylinder head casting is to be removable and a number of heat treated studs are provided to draw the head uniformly to the asbestos and copper gasket thus insuring a tight fit. A drop forged crankshaft of the three bearing type is provided. Great strength and freedom from vibration is assured by the size and careful workmanship of the

surfaces. Conbearing rods are drop necting forgings of alloy steel, designed and heat treated to give the maximum strength with the minimum weight. All moving parts are machined to a uniform weight as well as dimension so that all parts are in perfect balance with each other. Wrist pins are of the maximum possible size. Were their diameter to be increased by as slight an

amount as an eighth of an inch the bearing area would actually be found to be less. To provide the utmost effi-ciency in the power plant overhead valves are used. All valves are made with generous dimensions and material has not been spared in these essential places. All valve operating mechanism is fully enclosed and driven from a single camshaft. The rocker arms are special heat treated alloy steels and rotate on hardened bearings lubricated by the pressure system. Water passages in the manifolds are of ample size and very free. The method of The method of The cold water enters the circulating the water is new.

under side of the exhaust manifold leaving at the top. It enters the cylinder water jacket at the lowest point, passes upward and leaves at the cylinder head. Thus the exhaust manifold is cooled more and the cylinders receive hot water at a more uniform and efficient temperature than if cold water entered the cylinders directly. A stuffing box is provided on the end of the reverse gear case and keeps the oil in and the water out. This feature has been much neglected and has been found heretofore on only the most expensive motors.

To-day's motor boat user is looking for a complete power plant. The old days when an engine was sold as a mere cylinder and flywheel are past. A fully found plant which can be installed and will function with as little trouble as the modern automobile is what is wanted. The use of roller bearings is increasing as well as the use of overhead valves. A novel feature on one well known brand of motor is the introduction of a sliding gear transmission with an enclosed type of clutch which is radically different from the conventional marine reverse gear and clutch. Since this transmission has been tested and tried in actual service



A new model Erd in a popular size

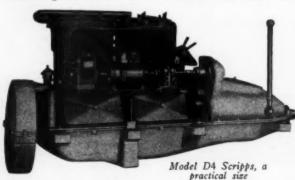
The use of engines of the completely standardized type has done much to make the standardized stock boat a real-Many of these are to-day sailing about and are successful mainly on account of the pioneer work done by the motor manufacturers.

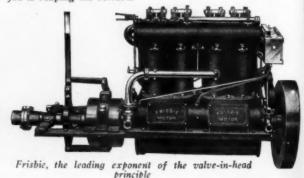
Small engines too are a necessity and low power plants which are built in a durable, substantial fashion are being readily absorbed throughout the country. New boats are constantly being built and older ones being fitted with motors.

Electrical equipment is also being improved. Starting and lighting generators are being fitted to most motors and magneto ignition in some form or other is practically universal.

Accessibility of parts, and facility in taking down, have also come in for attention. No longer is a handhold plate on the side of a motor made the size of a postage stamp. One can really get his hand and a wrench inside in case it is necessary to take up on a bearing or otherwise adjust

It is evident the marine motor manufacturers have not been standing still. Progress is apparent in all directions and the increasing flood of orders for American motors in large and small sizes from near and far markets attest their popularity. The man The manufacturer who has been on the





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eliable stand-by,

## American Manufacturers of Four-Cycle Motors

An Alphabetical List of Four-Cycle Marine Motors with the Name and Addresses of Their Manufacturers, Giving the Range of Powers Produced by Each

| Farm Core            | de Casaline and Vanasana Engines  |
|----------------------|---|
| Acme                 | le Gasoline and Kerosene Engines  Acme Engine Co., 163 Main St., San Francisco, Cal.  |
|                      | Acme Engine Co., 163 Main St., San Francisco, Cal. 8, 10, 16, 20, 25, 27, 35, 40, 45, 50, 55, 65, 80, 85, 100, 125 H. P. 1-6 cyls.  Acadia Gas Engines, Ltd., Bridgewater, N. S., Canada. 10, 15, 18, 20, 30, 40 H. P. 1-4 cyls.  American Engine Co., Detroit, Mich. 14 H. P. 4 cyls.  |
| Acadia               | Acadia Gas Engines, Ltd., Bridgewater, N. S., Canada. 10, 15, 18, 20, 30, 40 H. P. 1-4 cyls.  |
| American             | American Engine Co., Detroit, Mich.   |
| Anderson             | 14 H. P. 4 cyls. Anderson Engine Co., 4032 N. Rockwell St., Chicago, Ill. 4, 8, 12, 24, 50 H. P. 1-4 cyls. Caille Perfection Motor Co., Detroit, Mich. 14 H. P. 4 cyls.   |
| Aristocrat           | Caille Perfection Motor Co., Detroit, Mich. 14 H. P. 4 cyls.  |
| Automatic            | The Automatic Machine Co., Bridgeport, Conn. 3, 6, 9, 12, 18, 24, 25, 37, 50, 75, 100 H. P. 1-6 cyls.   |
| Atias Imperial       | 14 H. P. 4 cyls. The Automatic Machine Co., Bridgeport, Conn. 3, 6, 9, 12, 18, 24, 25, 37, 50, 75, 100 H. P. 1-6 cyls. Atlas Imperial Eng. Co., Ft. 19th Ave., Oakland, Cal. 6, 8, 10, 12, 10, 20, 30, 35, 45, 50, 55, 60, 80, 90, 110, 125, 150 H. P. 1-4 cyls. Barber Bros., King Bros., Successors, Syracuse, N. Y. 3 H. P. 1 cyl. Rayer Machine Co., Fast Oakland, Cal.   |
| Barber               | Barber Bros., King Bros., Successors, Syracuse, N. Y.   |
| Boyer                | Boyer Machine Co., East Oakland, Cal.   |
| Brennan              | Brenan Moor of Co., Syracuse, N. Y.   |
| Bridgeport           | Bridgeport Motor Co., Inc., Bridgeport, Conn.   |
| Buffalo              | . Barber Bros., King Bros., Successors, Syracuse, N. Y. 3 H. P. 1 cyl Boyer Machine Co., East Oakland, Cal. 5, 10 H. P. 1-2 cyls Brennan Motor Mig. Co., Syracuse, N. Y. 20, 35, 40, 50, 60, 80 H. P. 4-6 cyls Bridgeport Motor Co., Inc., Bridgeport, Conn. 14, 30, 45, 60 H. P. 2-4 cyls Buffalo Gasoline Motor Co., Buffalo, N. Y. 12, 15, 20, 22, 24, 30, 45, 60, 70, 80, 100, 150 H. P. 2-6 cyls N. Cady Co., Inc., Canastota, N. Y. 16 H. P. 4 cyls Caille Perfection Motor Co., Detroit, Mich.   |
| Cady of Canastota    | .C. N. Cady Co., Inc., Canastota, N. Y.<br>16 H. P. 4 cyls.   |
| Caille               | 10 H. P. 4 cyls. Caille Perfection Motor Co., Detroit, Mich. 14 H. P. 4 cyls. Fifield Bros. Co., Augusta, Me. 3, 6, 7, 10, 12, 15, 18, 20, 30 H. P. 1-3 cyls. Carl Engine Wks., 103 N. 2nd St., Philadelphia, Pa. 4, 5, 8, 11, 16, 18, 24, 36 H. P. 1-4 cyls. Carson Motor Co., 616 Penobscot Bldg., Detroit, Mich. 15 H. P. 4 cyls.  |
| Capital              | Fifield Bros. Co., Augusta, Me. 3, 6, 7, 10, 12, 15, 18, 20, 30 H. P. 1-3 cyls.   |
| Carl                 | Carl Engine Wks., 103 N. 2nd St., Philadelphia, Pa. 4, 5, 8, 11, 16, 18, 24, 36 H. P. 1-4 cyls.   |
| Carson               | Carson Motor Co., 616 Penobscot Bldg., Detroit, Mich.   |
| Chesapeake           | Chesapeake Engine Co., Oxford, Md. 7 H. P. 1 cyl.   |
| Doak                 | Doak Gas Engine Co., Oakland, Cal. 30, 40, 45, 60, 75, 90, 100, 150, 200, 300 H. P. 2-6 cyls.   |
| Doman                | 4, 7, 15, 25, 40, 50 H. P. 1-4 cyls.  |
| Dunn                 | 2, 4, 6, 8, 12, 16, 24 H. P. 1-6 cyls.  |
| du Pont              | 15 H. P. 4 cyls. Chesapeake Engine Co., Oxford, Md. 7 H. P. 1 cyl. Doak Gas Engine Co., Oxford, Cal. 30, 40, 45, 60, 75, 90, 100, 150, 200, 300 H. P. 2-6 cyls. Universal Products Co., Oxfordsh, Wis. 4, 7, 15, 25, 40, 50 H. P. 1-4 cyls. Dunn Motor Wks., Ogdensburg, N. Y. 2, 4, 6, 8, 12, 16, 24 H. P. 1-6 cyls. du Pont Motors, Inc., Commerce St., Wilmington, Del. 20, 40, 60 H. P. 2-6 cyls. The Elco Co., Bayonne, N. J. 65, 100 H. P. 4-6 cyls. Enterprise Foundry Co., Southern Pacific Bldg., San  |
| Elco                 | 65, 100 H. P. 4-6 cyls.   |
| Enterprise           | Enterprise Foundry Co., Southern Pacific Bldg., San Francisco, Cal.   |
| Erd                  | Evansuite Gas Engine Wks., 1230 Riverside Ave., Evans-<br>Evansuite Gas Engine Wks., 1230 Riverside Ave., Evans-  |
| Evansville           | Evansville Gas Engine Wks., 1230 Riverside Ave., Evans-   |
| F & B                | Evansville Gas Engine Wks., 1230 Riverside Ave., Evansville, Ind. 334, 5, 734, 8, 10, 15, 16, 20, 24, 32 H. P. 1-4 cyls. Fay & Bowen Engine Co., Geneva, N. Y. 17, 40, 45, 50, 65 H. P. 4-6 cyls. Loane Engineering Co., Baltimore, Md. 4, 6, 12, 18, 24 H. P. 1-4 cyls. Foreman Motor & Machine Co., Ltd., Lake St., Toronto, Ont., Can. 20, 40, 60 H. P. 2-6 cyls. ad) Frisbie Motor Co., Middletown, Cons.   |
| Fisherman            | 17, 40, 45, 50, 65 H. P. 4-6 cyls.<br>Loane Engineering Co., Baltimore, Md.   |
| _                    | 4, 6, 12, 18, 24 H. P. 1-4 cyls.<br>Foreman Motor & Machine Co., Ltd., Lake St., Toronto,   |
| Frisbie (Valve-in-he | Ont., Can. 20, 40, 60 H. P. 2-6 cyls. ad). Frisbie Motor Co., Middletown, Conn.   |
| Frisco Standard      | Foreman Motor & Machine Co., Ltd., Lake St., 1 oronto, Ont., Can. 2nd) Frisbie Motor Co., Middletown, Conn. 5, 7, 10, 16, 18, 25, 30, 40, 50, 75 H. P. 1-6 cyls. Standard Gas Engine Co., Oakland, Cal. 5, 8, 10, 12, 16, 20, 25, 30, 40, 50, 65, 80, 85, 110, 120, 175 H. P. 1-4 cyls. Gaeth Motora Co., 2101 Abbey Ave., Cleveland, O. 18, 27, 36, 50, 54, 75 H. P. 2-6 cyls. J. S. Gaffga & Sons, Greenport, N. Y. 12 H. P. 4 cyls.  |
|                      | 5, 8, 10, 12, 16, 20, 25, 30, 40, 50, 65, 80, 85, 110, 120, 175 H. P. 1-4 cyls.   |
| Gaeth                | Gaeth Motors Co., 2101 Abbey Ave., Cleveland, O. 18, 27, 36, 50, 54, 75 H. P. 2-6 cyls.   |
| Gaffga               | J. S. Gaffga & Sons, Greenport, N. Y.<br>12 H. P. 4 cyls.   |
| Gilmore              | Gilmore Marine Motor Corp., 404 24th St., Detroit, Mich. 5, 10 H. P. 2-4 cyls.  |
| Gray-Prior           | 12 H. P. 4 cyls. Gilmore Marine Motor Corp., 404 24th St., Detroit, Mich. 5, 10 H. P. 2-4 cyls. Gray & Prior Machine Co., 56 Suffield St., Hartford, Conn. 36 H. P. 4 cyls.   |
| Gray                 | Conn. Gray Motor Co., 2108 Mack Ave., Detroit, Mich. 25, 35, 45 H. P. 4 cyls. Guarantee Motor Co., 360 Bay St., North, Hamilton, Ont., Can. 34, 6, 8, 10, 12, 16, 20, 25, 50 H. P. 1-4 cyls. Hall Scott Motor Car Co., Inc., Berkeley, Cal. 125, 200 H. P. 4-6 cyls. H. L. Brownback Co., Norristown, Pa. 4 H. P. 2 cyls. Harris Marine Engine Co., 205 West Front St., Wilmington, Del.  |
| Guarantee            | Ont., Can.  |
| Hall-Scott           | Hall Scott Motor Car Co., Inc., Berkeley, Cal.  |
| H. L. B              | H. L. Brownback Co., Norristown, Pa.  |
| Harris               | . Harris Marine Engine Co., 205 West Front St., Wilming-  |
| Hess                 | 10, 15, 18, 30, 50, 70, 100, 115, 175 H. P. 2-6 cyls.   |
| Hettinger            | Harris Marine Engine Co., 205 West Front St., Wilmington, Del. 10, 15, 18, 30, 50, 70, 100, 115, 175 H. P. 2-6 cyls. Hess Motor Co., Inc., 120 Sherman St., Detroit, Mich. 5 H. P. 4 cyls. Hettinger Engine Co., Bridgeton, N. J. 6, 9, 12, 18, 25, 36, 50 H. P. 1-4 cyls. Hicks Iron Wks., 967 Howard St., San Francisco, Cal. 6, 8, 10, 12, 16, 20, 20, 35, 80 H. P. 1-3 cyls. The Clay Engine Mig. Co., 664 E. 72nd St., Cleveland, O. 4, 6, 8, 10, 12, 16, 20, 25, 35, 50, 100 H. P. 1-4 cyls. Everett Hunter Boat Co., McHenry, Ill. 10, 12, 20 H. P. 4 cyls. 10, 12, 20 H. P. 4 cyls. 1, V. B. Engine Co., 5912 Central Ave., Cleveland, O. 49, 60 H. P. 4 cyls. Kermath Mig. Co., Detroit, Mich. 12, 18, 25, 40 H. P. 4 cyls. Camden Anchor-Rockland Machine Co., Camden, Me. 6, 8, 12, 16, 25, 50, 75 H. P. 1-6 cyls. |
| Hicks                | 6, 9, 12, 18, 25, 36, 50 H. P. 1-4 cyls.<br>Hicks Iron Wks., 967 Howard St., San Francisco, Cal   |
| Honest Clay          | 6, 8, 10, 12, 16, 20, 30, 35, 80 H. P. 1-3 cyls.<br>The Clay Engine Mfg. Co., 664 E. 72nd St., Cleveland, O.  |
| Hunter               | 4, 6, 8, 10, 12, 16, 20, 25, 35, 50, 100 H. P. 1-4 cyls.<br>Everett Hunter Boat Co., McHenry, Ill.  |
| J. V. B              | 10, 12, 20 H. P. 4 cyls.<br>J. V. B. Engine Co., 5912 Central Ave., Cleveland, O.   |
| Kermath              | 40, 60 H. P. 4 cyls.<br>Kermath Mfg. Co., Detroit, Mich.  |
| Knor                 | 12, 18, 25, 40 H. P. 4 cyls.<br>. Camden Anchor-Rockland Machine Co., Camden, Me.   |
| Knox (Valve-in-Hea   | 6, 8, 12, 16, 25, 50, 75 H. P. 1-6 cyls. d). Knox Motors Associates, Springfield, Mass.   |
| Lathrop              | . Camden Anchor-Rockiand Machine Co., Camden, Me. 6, 8, 12, 16, 25, 50, 75 H. P. 1-6 cyls. d). Knox Motors Associates, Springfield, Mass. 20-40 H. P. 4 cyls J. W. Lathrop Co., Mystic, Conn. 12, 16, 21, 28, 30, 40 H. P. 2-4 cyls LeRoi Co., Mitchell St. and 60th Ave., Milwaukee, Wis. 9-12 H. P. 4 cyls.   |
| LeRol                | 12, 16, 21, 28, 30, 40 H. P. 2-4 cyls.<br>. LeRoi Co., Mitchell St. and 60th Ave., Milwaukee, Wis.  |
|                      | 9-12 H. P. 4 cyls.  |

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|---------------------|---|
| Lewis Ultra Six     | Lewis Motor Mfg. Co., Fostoria, O.<br>30 H. P. 6 cyls.  |
| Liberty Kid         | A. G. Hebgen, 440 Market St., San Francisco, Cal.   |
| M & T               | Murray & Tregurtha Corp., Atlantic, Mass.   |
| Mianus              | Mianus Motor Wks., Stamford, Conn.  |
| Miller              | 16, 24, 32 H. P. 2-4 cyls.<br>Miller Engine Co., 2329 N. Talman Ave., Chicago, Ill.   |
| Motordo             | 4, 6, 10, 14, 20, 22, 30, 35, 50 H. P. 1-4 cyls.<br>Sears, Roebuck & Co., 925 Homan Ave., Chicago, Ill.   |
| Niedara             | 16 H. P. 4 cyls.  |
| Violand             | 12, 35, 80, 120, 160 H. P. 2-8 cyls.  |
| Nietand             | 11/2, 2, 21/4, 4, 6, 8, 12, 16, 18, 20, 24 H. P. 1-8 cyls.  |
| N & S               | 20, 30, 40, 80 H. P. 2-6 cyls.  |
| Olympic             | . Woodhouse Gasoline Engine Co., Seattle, Wash.<br>4, 8 H. P. 1-2 cyls.   |
| Pacific Heavy-Duty. | Pacific Marine Engine Co., 78 Marion St., Seattle, Wash. 7 H. P. 1 cvl.   |
| Palmer              | Palmer Bros. Engines, Inc., Cos Cob, Conn.  |
| Dandes              | 60, 80 H. P. 1-6 cyls.  |
| Peer less           | N. Y. 6, 12, 20, 24, 35, 50 H. P. 1-4 cyls.   |
| Philadelphia        | 8, 16 H. P. 1-2 cyls.   |
| Red Wing            | Red Wing Motor Co., Red Wing, Minn.<br>14, 20, 24, 36, 40 H. P. 4 cyls.   |
| Regal               | Regal Gasoline Engine Co., Coldwater, Mich.<br>2. 4. 5. 7. 8. 9. 10. 14. 18. 20. 30. 32. 36. 50 H. P. 1-4 cyls.   |
| Reliable Heer       | Reliable Tractor & Engine Co., Portsmouth, O.   |
| Roberts             | Roberts Motor Co., 131 Arthur St., Sandusky, O.   |
| Scripps             | Scripps Motor Co., 631 Lincoln Ave., Detroit, Mich.   |
| Seattle Standard    | Seattle Standard Eng. Mfg. Co., 821 Western Ave.,   |
| Speedway            | Seattle, Wash. 4, 7, 8, 15, 20 H. P. 1-2 cyls. Consolidated Shipbuilding Corp., Morris Heights, N. Y.   |
|                     | 28, 44, 66, 75, 115, 130, 150, 160, 175, 200, 250 H. P. 4-8 cvls.   |
| Standard            | Standard Motor Construction Co., 172 Whiton St., Jersey City. N. I.   |
|                     | 12, 18, 24, 27, 37, 54, 60, 75, 90, 100, 150, 220, 300, 500   |
| Sterling            | Sterling Engine Co., 1252 Niagara St., Buffalo, N. Y.   |
| G                   | 250, 300 H. P. 2-8 cyls.  |
| Sturtevant          | 75 H. P. 4 cyls.  |
| Superior            | Superior Motor Works, Jackson, Mich.<br>6, 12, 25 H. P. 1-4 cyls.   |
| Trego Model No. 17. | Trego Motors Corp., New Haven, Conn.<br>28 H. P. 2 cvls.  |
| Treiber             | Treiber Engine Co., Yonkers, N. Y.  |
| Twentieth Century.  | . New York Yacht, Launch & Engine Co., Morris Heights,  |
| Union               | . Union Gas Engine Co., Oakland, Cal.   |
|                     | 325, 375 H. P. 1-6 cyls.  |
| Universal           | Universal Motor Co., Oshkosh, Wis.<br>12 H. P. 4 cyls.  |
| Van Blerck          | Van Blerck Motor Co., Monroe, Mich.<br>100, 150, 200 H. P. 4-8 cyls.  |
| Vulcan              | Vulcan Engine Works, 1827 Bainbridge St., Phila., Pa. 4, 5, 714, 8, 10, 11, 15, 16, 20, 22, 25, 30, 35, 40, 45, 56,   |
| Waukesha            | . Waukesha Motor Co., Waukesha, Wis.  |
| Winton              | 20, 31, 36, 40, 50 H. P. 4 cyts.<br>Winton Engine Wks., 2116 West 108th St., Cleveland, O.  |
| Wisconsin           | Lewis Motor Mfg. Co., Fostoria, O. 30 H. P. 6 cyis. A. G. Hebben, 440 Market St., San Francisco, Cal. 314, 8 H. P. 1-2 cyls. Marray & Tregurtha Corp., Atlantic, Mass. 18, 28, 40, 60, 100, 400 H. P. 2 cyls. Mianus Motor Wks., Stamford, Conn. 16, 24, 32 H. P. 2-4 cyls. Miller Engine Co., 2329 N. Talman Ave., Chicago, Ill. 46, 10, 14, 20, 22, 30, 35, 50 H. P. 1-4 cyls. Sears, Roebuck & Co., 925 Homan Ave., Chicago, Ill. 16 H. P. 4 cyls. Niagara Motors Corp., Dunkirk, N. Y. 12, 35, 80, 120, 160 H. P. 2-8 cyls. J. E. Nieland Co., 1728 Bryant St., San Francisco, Cal. 1145, 2, 245, 4, 6, 8, 12, 16, 18, 20, 24 H. P. 1-3 cyls. N. & S. Engine Co., 1144 Elliott Ave., Seattle, Wash. 20, 30, 40, 80 H. P. 2-6 cyls. Woodhouse Gasoline Engine Co., Seattle, Wash. 4, 8 H. P. 1-2 cyls. Pacific Marine Engines Co., 78 Marion St., Seattle, Wash. 7 H. P. 1 cyl. Palmer Bros. Engines, Inc., Cos Cob, Conn. 314, 445, 5, 6, 634, 7, 11, 12, 15, 18, 20, 24, 25, 26, 35, 50, 60, 80 H. P. 1-6 cyls. Peerless Marine Motor Corp., 2150 Niagara St., Buffalo, N. Y. 6, 12, 20, 24, 35, 50 H. P. 1-4 cyls. Central Machine Co., 77th St. and Wood, Philadelphia, Pa. 8, 16 H. P. 1-2 cyls. Red Wing Motor Co., Red Wing, Minn. 14, 20, 24, 36, 40 H. P. 4 cyls. Regal Gasoline Engine Co., Coldwater, Mich. 2, 4, 5, 7, 8, 9, 10, 14, 18, 20, 30, 32, 38, 50 H. P. 1-4 cyls. Rehable Tractor & Engine Co., Coldwater, Mich. 2, 4, 5, 7, 8, 9, 10, 14, 18, 20, 30, 32, 38, 50 H. P. 1-4 cyls. Rehable Tractor & Engine Co., Coldwater, Mich. 2, 4, 5, 7, 8, 9, 10, 14, 18, 20, 30, 32, 38, 50 H. P. 1-2 cyls. Roberts Motor Co., 631 Lincoln Ave., Detroit, Mich. 18, 35, 45, 50, 75 H. P. 2-6 cyls. Seartle, Wash. 4, 7, 8, 15, 20 H. P. 1-2 cyls. Seartle, Wash. 4, 7, 8, 15, 20 H. P. 1-2 cyls. Seartle, Wash. 5, 17, 27, 37, 54, 60, 75, 90, 100, 150, 220, 300, 500 18, P. 2-6 cyls. Seartle Engine Co., Olohosh, Wis. 19, 15, 20, 30, 40, 60, 85, 110, 125, 145, 150, 170, 200, 225, 256, 300, 325, 375 H. P. 1-6 cyls. N. Y. 10, 150, 200 H. P. 4-8 cyls. N. Y. 11, 150, 20, 30, 40, 60, 60, 11, 15, 125, |
| Wolverine           | Wolverine Motor Wks., Bridgeport, Conn.   |
| Wood & Chute        | . Wood & Chute, Inc., Greenport, N. Y.  |
| Wright Reliable     | . Wright Machine Co., Owensboro, Ky.  |
|                     | 10, 15, 20, 30, 40, 60, 90 H. P. 2-6 cyls.  |
| F                   | our-Cycle Outboard Motors   |
| Airdrive            | . Kemp Machine Wks., Muncie, Ind.   |
| Evinendo            | 3, 10 H. P. 2 cyls.  Fyingude Motor Co. 279 Walker St. Wilwaukes, Wis.  |

| Airdrive | . Kemp Machine Wks., Muncie, Ind.  |    |
|----------|--|----|
|          | 3, 10 H. P. 2 cyls.<br>Evinrude Motor Co., 279 Walker St., Wilwaukee, Wis. |    |
| Evinrude | Evinrude Motor Co., 279 Walker St., Wilwaukee, Wis. 4 H. P. 2 cvls.        |    |
| Joymotor | Adams Motor & Mfg. Co., 3914 Costello Ave., Chicago                        | ), |
|          | Ill. 2 H. P. 1 cyl.  |    |

#### Four-Cycle Heavy Oil Engine Manufacturers

| Atlas Diesel      | Atlas Imperial Engine Co., Oakland, Cal.   |
|-------------------|--|
| D 4               | 100 H. P. and up. 4-6 cyls.  |
| Dodge             | Dodge Manufacturing Co., Mishawaka, Ind.<br>1214, 25, 3714, 50, 75 H. P. 1-6 cyls.                   |
| Craig             | James Craig Engine & Machine Works, 807 Garfield Ave.<br>Jersey City, N. J.                          |
| Dow               | Dow Pump & Diesel Co., Alameda, Cal.<br>320 to 1415 H. P. 6-8 cvls.                                  |
| Fulton            | Fulton Mfg. Co., Erie, Pa.<br>50, 70, 100 H. P. 3-6 cyls.  |
| Ingersoll-Rand P. | R. TypeIngersoll-Rand Co., 11 Broadway, New York<br>N. Y. 220, 300, 500 H. P. 6 cyls                 |
| Midwest Diesel    | Midwest Engine Co., Indianapolis, Ind.<br>60, 90, 120, 180 H. P. 2-6 cyls.<br>(Continued on page 48) |

## Four-Cycle Marine Motors for 1921

The initials used in the column under Location of Valves have the following meaning: L, both inlet and exhaust valves on same side of cylinder; T, inlet and exhaust valves on opposite sides of cylinder; H, valves in cylinder head. The initials used in the column under Ignition indicate the standard equipment furnished and have the following meanings: M & B, make and break system with battery and coil or low tension magneto; B & M, both battery and high-tension magneto system; M, high-tension magneto with impulse starter; JS, jump spark battery and coil system; B Dist., battery with distributor; Dual M, two separate high-tension magneto systems operating independently; D M D, dual magneto and distributor; D, Delco system; A. K., Atwater Kent system; Dbl, separate double systems; Opt., purchaser has the option of make and break or jump spark systems

|  | Four-Cycle Me   | otors Under   | 6 Horsepower  |  |  | Bore &   |                                   | Location                                      |                               |
|--|---|---|---|--|--|--|-----------------------------------|---|-------------------------------|
| Lated  | No.   | of Bore &   | Location  |  |  | Stroke<br>4%x5   | R.P.M.<br>550                     | Wt. Valves                                    | Ignition<br>J. S.             |
| I. P.  |   | s. Stroke R.  | P.M. Wt. Valves   | Ignition 10  | Gilmore 4                                      | 3 x31/2  | 750                               | 225 H   | J. S.                         |
| 11/2   | Nieland 1   | 3 ×314 7  | 00 L  | Opt.   10  | Guarantee 1                                    | 7 x7   | 500                               | 900 L   | J. S.                         |
| 2 2  | Dunn I  | 3%x4 5  | 00 100 L  | J. S.   10   | Harris 2                                       | 5 x51/2  | 450<br>400                        | 550<br>1,500 H                                | Opt.<br>M. & B.               |
| 2  | Nieland I<br>Regal I  |   | 00 275 L<br>00 125 L  |  | Hicks 1<br>Honest Clay 1                       | 716x816<br>716x7   | 375                               | 1,040 H                                       | I. S.                         |
| 21/2   | Nieland 1   | 4 x41/2 5   | 60 275 L  | M. & B. 10   | Hunter 4                                       | 236x4  | 800                               | 260 L   | J. S.<br>B. & M.              |
| 3  | Automatic 1<br>Barber 1   |   | 00 300 L<br>00 135  | Opt. 10<br>L. S. 10                                  | Miller 2<br>Palmer 2                           | 435x6<br>435x435   | 600<br>650                        | 625 L<br>325 L                                | M.                            |
| 314  | Liberty Kid 1   |   | 50 160 H  | J. S. 10<br>Opt. 10                                  | Regal 2  | 43%x53%  | 600                               | 725 L   | J. S.<br>S.<br>M.             |
| 334  | Palmer 1  | 432x432 6   | 00 350 T  | J. S. 10   | Reliable Heer 2 opp.                           | 5 x5   | 600                               | 900 H   | M.                            |
| 31/3   | Standard Kid  | 3%x3% 7   | 00 350 T<br>50 110 H<br>00 290 H  | Opt. 10  | Sterling 4<br>Vulcan 2                         | 234 x434   | 1,000                             | 250 L<br>950 T                                | M.                            |
| 3%   | Evansville 1<br>Anderson 1  |   | 00 290 H<br>50 400 T  | I. S. 10   | Vulcan 2<br>Wright Reliable 1                  | 534×7<br>6 ×73/2   | 450                               | 950 T<br>1,280 H                              | J. S.<br>M. I. S.             |
| 4  | Carl 1  | 41/2×5 5  | 00 350 1.   | J. S.<br>J. S.<br>A. K.                              |  |  |                                   |   |                               |
| 4  | Doman 1   | 3%x436 6  | 00 200 H  | Opt.   | 11 to 15 Horse                                 | bower F  | our-C1                            | cle Motors                                    |                               |
| 4  | Dunn 2<br>Fisherman 1   |   | 600 215 L<br>550 H  | }. S.  |  |  | -                                 | Location                                      |                               |
| 4  | H. L. B. 2  | 2½x5 1,3  | 200 120 L   | B. D. Rate   | d No. of                                       | f Bore &   |                                   | of  |                               |
| 4  | Honest Clay   | 4½x5  | 385 H   | J. S. H. F<br>M. 11                                  | . Motor Cyls.                                  | Stroke<br>5 x6   | R.P.M.<br>500                     |   | Ignition                      |
| 4  | Miller<br>Nieland   | 432x5 6   | 500 410 L<br>100 525 L  | M. & B. 11   | Carl 2<br>Palmer 2                             | 436x6  | 600                               | 650 L<br>650 T<br>1,100 T                     | A. K.<br>A. K.                |
| 4  | Nieland 2   | 314x4   | 00 400 L  | J. S.   11   | Vulcan 1                                       | 736×836  | 400                               | 1,100 T                                       | J. S.<br>M.                   |
| 4  | Olympic 1   | 3% x459   |   | J. S.   12   | Anderson 2                                     | 5 x6   | 500                               | 1,000 T<br>1,425 H                            | M. & B.                       |
| 4  | Regal<br>Seattle Standard   |   | 700 290 L<br>900 190 H  | J. S. 12<br>J. S. 12                                 | Atlas Imperial 2<br>Automatic 2                | 534x7  | 425<br>400                        | 1,425 H<br>1,115 L<br>1,170 L                 | Opt.                          |
| 4  | Vulcan  | 45/4×6  | 500 450 T   | I. S.   12   | Buffalo 2                                      | 5 x63/2  | 400                               | 1,115 L<br>1,170 L                            | Dbl.                          |
| 416  | Palmer  | 41/4x6 (  | 300 375 T   | J. S.   12   | Dunn 3   | 434×5  | 700                               | 875 L   | J. S.                         |
| 5  | Carl<br>Evansville  | 5 x6  | 100 490 L<br>500 425 H  | A. K. 12<br>I. S. 12                                 | Enterprise 2<br>Fisherman 2                    | 6 x8<br>5 x6   | 400<br>550                        | 2,700 H<br>1,100 H                            | M. & B.                       |
| 5  | Frisco Standard   |   | 100 1.220 T   | J. S.<br>M. & B. 12                                  | Fisherman 2<br>Frisco Standard 2               | 6 x7   | 380                               | 2,020 T                                       | Opt.                          |
| 5  | Frisbic Valve-in-head   | 4%x5  | 550 325 H   | J. S. 12   | Gaffga 2                                       | 5 x6   | 600                               | 900 T   | Μ.                            |
| 5  | Gilmore   | 2 3 x334 1  | 750 135 H<br>200 225 L  | ]. S. 12   | Guarantee 2<br>Hettinger 2                     | 514x6  | 500<br>550                        | 900 L<br>785 L                                | J. S.<br>A. K.                |
| 5  | Hess<br>Regal   |   | 900 225 L<br>500 380 L  | M. 12<br>J. S. 12                                    | Hicks 2  | 534×6<br>6 ×7  | 425                               | 2,200 H                                       | M. & B.                       |
| 5  | Union   | 5% x61/2  | 100 640 L   | M. & B.   12   | Honest Clay 2                                  | 536x7  | 400                               |   | J. S.                         |
| 5  | Vulcan  | 514x7   | 500 650 T   | J. S. 12<br>M. 12                                    | Hunter 4<br>Kermath 4                          | 316x41/2   | 800<br>1,200                      | 280 L<br>470 L                                | M.<br>M.                      |
| 6  | Wolverine<br>Atlas Imperial   |   | 500 494 L<br>100 925 H  | M. & B. 12   | Kermath 4<br>Knox 2                            | 31/2×4<br>5 ×51/4  | 600                               | 950 H   | J. S.                         |
| 6  | Automatic   | 516x7   | 100 643 L   | Opt.   12  | Lathrop 2                                      | 5 1 x 6 1/2  | 450                               | T   | J. S.<br>J. S.                |
| 6  | Automatic   | 454 XD  | 500 525 L   | Opt.   12  | Le Roi 4<br>Niagara 2                          | 31/4×41/4  | 1,000                             | 350 L<br>625 T                                | Opt.                          |
| 6  | Dunn<br>Enterprise  | 3 3%x4<br>1 6 x8  | 500 250 L<br>120 1,500 H  | J. S.<br>M. & B. 12                                  | Niagara 2<br>Nieland 2                         | 434×51/2<br>6 ×7   | 375                               |   | M. & B.                       |
| 6  | Fisherman   |   | 550 800 H   | I. S.   12   | Palmer 2                                       | 5 x6   | 600                               | 1,200 L<br>750 T<br>600 L                     | A. K.                         |
| 6  | Guarantee   | 51/2×6  | 500 555 L   | 1. S.   12   | Peerless 2                                     | 5 x6   | 600                               | 600 L   | J. S.<br>M. & B.              |
| 6  | Hettinger<br>Hicks  |   | 550 500 L<br>425 950 H  | M. & B. 12<br>M. & B. 12                             | Standard 2<br>Superior 2                       | 5 x6½<br>4½x6  | 450<br>750                        | 850 L   | I S                           |
| 6  | Honest Clay   | 51/27   | 375 850 H   | I. S. 12   | Union 2  | 6 87   | 400                               |   | J. S.<br>M. & B.              |
| 6  | Knox  | 1 5 x514  | 800 490 H   | J. S.   12   | Universal 4                                    | 2%x4   | 1,200                             | 1,290 L<br>300 L<br>664 T<br>664 T            | M.                            |
| 6  | Miller<br>Nieland   |   | 500 500 L<br>350 750 L  | M. & B. 14   | American 4<br>Aristocrat 4                     | 334x4<br>334x4   | 950<br>950                        | 664 T   | I.S.                          |
| 6  |   |   | 350 750 L<br>550 525 L  | M. & B. 14   | Bridgeport 2                                   | 51/2×61/2  | 500                               | 1,200 L                                       | M.                            |
| 6  | Palmer  | 1 5 x6  | 600 400 T   | J. S.   14   | Carl 2   | 6 x8   | 400                               | 650 L   | J. S.                         |
| 6  | Peerless<br>Superior  |   | 600 450 L<br>750 L  | I. S. 14<br>I. S. 14                                 | L-A 4<br>Miller 2                              | 3% x41/2<br>51/4 x61/2   | 900<br>500                        | 800 L   | M.                            |
|  |   |   |   | 1 14   | Red Wing 4                                     | 2%x4   | 1,000                             | 300 L   | M.                            |
|  | 61/2 to 10 Hor  | sepower Fo  | ur-Cycle Moto   | rc 14  | Regal 2  | 514x612  | 550<br>425                        | 985 L<br>1,279 L                              | Opt.<br>M.                    |
|  | , -   |   | Location  |  | Wolverine 2<br>Buffalo 2                       | 634x7<br>6 x734  | 350                               | 1,400 L                                       | Dbl.                          |
| Rated  |   | of Bore &   | of  | 14   | Caille 4                                       | 33/4×4   | 950                               | 664 T   | J. S.                         |
| H. P.  | Motor C3  | ls. Stroke R.   | P.M. Wt. Valves   | Ignition   15  | Carson 4                                       | 256×4  | 1,000                             | 300 L<br>800 T                                | Opt.<br>M.                    |
| 61/2   | Palmer<br>Chesapeake  | 1 53%x6<br>1 5 x6   | 600 425 T<br>600 500 L  | J. S. 15<br>M. 15                                    | Doman 2<br>Evansville 4                        | 4%x6<br>434x5  | 500                               | 800 T<br>625 H                                | J. S.                         |
| 7  | Doman   |   | 600 500 T   | Opt. 15  | Harris 2                                       | 51/2×61/4  | 500                               | 000   | Opt.                          |
| 7  | Frisbie Valve-in-head   | 1 6 x6  | 500 500 H   | J. S.   15   | Pacific Heavy-Duty 2                           | 6 x7   | 400<br>600                        | 1,500 H<br>900 T<br>700 T                     | J. S.<br>A. K.                |
| 7 7  | Guarantee<br>Pacific Heavy-Duty   | 1 6 x5<br>1 6 x7  | 400 890 H   | J. S. 15<br>M. 15                                    | Palmer 3<br>Seattle Standard 2                 | 434x6<br>434x6   | 600                               | 700 T   | I. S.                         |
| 7  | Palmer  | 2 436x436   | 600 500 T   | A. K. 15   | Sterling 2                                     | 534x7  | 500                               | 1.150 L                                       | I.S.                          |
| 7  | Regal   | 1 51/4×61/2   | 550 760 L   | Opt.   15  | Vulcan 2                                       | 635x734  | 475                               | 1,350 T<br>1,780 H                            | J. S.<br>M. I. S.             |
| 714  | Seattle Standard<br>Evansville  | 1 5 x6<br>2 436x5   | 600 575 T<br>500 390 H  | J. S. 15   | Wright Reliable 1                              | 71/2×9   | 350                               | 1,760 H                                       | M. I. S.                      |
| 736  | Vulcan  | 1 614x714   | 450 850 T   | J. S. 15<br>J. S. 15                                 | 16 to 20 Horse                                 | borner I   | our-C                             | vele Motor                                    | 2                             |
| 8  | Acme  | 1 614x71/2  | 360 1,470 H   | Opt.   | 10.0 20 110/30                                 | Tower 1  | J 0                               | Locatio                                       |                               |
| 8  | Anderson<br>Atlas Imperial  | 2 4½x5  | 550 550 T<br>400 1,075 H  | M. & B. Ra   | ned No.  | of Bore &  |                                   | of  |                               |
| 8  | Carl  | 1 63%x8   | 350 750 L   | A. K. H.   | P. Motor Cyla                                  | . Stroke   | R.P.M                             | . Wt. Valves                                  |                               |
| 8  | Carl  | 2 4½x5  | 600 450 L   | A. K.   16   | Acme 2   | 614x714  | 360                               | 2,250 H                                       | O. N. B. B                    |
| 8  | Dunn  | 2 414x5   | 700 300 L   | J. S. 16   | Atlas Imperial 2                               |  | 380<br>800                        | 2,475 H<br>385 L                              | M. & B                        |
| 8  | Enterprise<br>Evansville  | 1 6% x8<br>1 6 x6%  | 400 1,750 H<br>500 650 H  | M. & B. 16<br>J. S. 16                               | Cady of Canastota 4<br>Carl 2                  |  | 400                               |   | A. K.                         |
| 8  | Frisco Standard   | 2 4%×6  | 440 1,443 T   | Opt. 16  | Dunn 4   | 434x5  | 700 -                             | 475 L   |                               |
| 8  | Guarantee   | 1 6 x7  | 500 800 L   | J. S.   16   | Enterprise 2                                   | 6%x8   | 400<br>500                        | 2,880 H<br>925 H                              | M. & E                        |
| 8  | Hicks<br>Honest Clay  | 1 614x714<br>1 614x7  | 425 1,100 H<br>375 960 H  | M. & B. 16   | Evanaville<br>Frishie Valve-in-head 2          |  | 550                               | 700 H   | J. S.                         |
| 8  | Honest Clay   | 2 436x5   | 500 575 H   | J. S. 16<br>J. S. 16<br>J. S. 16                     | Frisco Standard 2                              | 634 x735   | 360                               | 2,418 T<br>1,000 L                            | Opt.                          |
| 8  | Knox  | 1 5½x6¼   | 600 880 H   | J. S. 16   | Guarantee 2                                    | 6 x7   | 450                               | 1,000 L                                       | J. S.<br>M. & E               |
|  | Liberty Kid   | 2 3%x4½   | 750 260 H<br>325 900 L  | Opt.   16  | Hicks 2<br>Honest Clay 2                       |  | 425                               | 2,500 H<br>2,025 H                            | I. S.                         |
| 8  | Nieland<br>Nieland  | 1 636x8<br>2 5 x6   | 325 900 L<br>400 800 L  | M. & B. 16<br>M. & B. 16                             | Knox 2   | 516x634  | 600                               | 1.250 H                                       | J. S.<br>S.<br>S.             |
| 8  |   | 2 3%x41/2   | 700 400 H   | J. S. 16   | Lathrop 2                                      | 534x634  | 450                               | 1,600 T                                       | J. S.                         |
| 8  | Olympic   | 1 6 x8  | 350 1,000 L   | M. & B. 16   | Mianus 2                                       | 6 x8   | 400                               | 650   | Opt.<br>M.                    |
| 8 8 8 8 8  | Philadelphia  | 2 4 *416  | 800 520 L<br>,000 185 L   | J. S. 16   | Motorgo 4<br>Nieland 2                         | 3%x4½<br>6½x8  | 800<br>325                        | 1,400 L                                       | M. & II                       |
| 888888   | Philadelphia<br>Regal   | 0 23/-4 0   | ,000 185 L<br>950 205 L   | J. S. 16<br>J. S. 16<br>J. S. 16<br>J. S. 16         | Philadelphia 2                                 | 634x8  | 375                               |   | M. & E                        |
| 8888888  | Philadelphia<br>Regal<br>Roberts  | 2 3%x4 1  |   | J. S. 16   | Reliable Heer 2 o                              | nn 6 x6  | 550                               | 1,150 H                                       | M                             |
| 888888   | Philadelphia<br>Regal   | 2 3%x4 1<br>2 3%x4  | 550 700 T   | J. D. 11 10  |  |  |                                   |   |                               |
| 88888888   | Philadelphia<br>Regal<br>Roberts<br>Seattle Standard<br>Vulcan<br>Automatic   | 2 3%x4 1<br>2 3%x4<br>2 4%x6<br>3 4%x5  | 550 700 T<br>500 760 L  | Opt.   16  | Vulcan 4                                       | 456x6  | 550                               | 1,000 T                                       | 1. S.                         |
| 888888899  | Philadelphia<br>Regal<br>Roberts<br>Seattle Standard<br>Vulcan<br>Automatic<br>Hettinger                                      | 2 3%x4 1<br>2 3%x4<br>2 4%x6<br>3 4%x5  | 550 700 T<br>500 760 L<br>550 640 L   | Opt. 16<br>A. K. 16                                  | Wood & Chute 2                                 | 6 x7   | 400                               | 1,300 L                                       | 1. S.<br>M.                   |
| 8888888999   | Philadelphia<br>Regal<br>Roberts<br>Seattle Standard<br>Vulcan<br>Automatic<br>Hettinger<br>Le Roi                            | 2 3%x4 1<br>2 3%x4<br>2 4%x6<br>3 4%x5<br>2 4%x6<br>4 2%x4 1  | 550 700 T<br>500 760 L<br>550 640 L<br>.000 330 L                               | Opt. 16<br>A. K. 16<br>Opt. 17                       | Wood & Chute 2<br>Fay & Bowen 4<br>Acadia 2    | 334×434  | 1,400<br>850                      | 1,300 L<br>450 L                              | J. S.<br>J. S.<br>M.<br>J. S. |
| 8<br>8<br>8<br>8<br>8<br>8<br>8<br>9<br>9<br>9       | Philadelphia<br>Regal<br>Roberts<br>Seattle Standard<br>Vulcan<br>Automatic<br>Hettinger<br>Le Roi<br>Regal<br>Acadia         | 2 334x4 1<br>2 334x4<br>2 454x6<br>3 454x5<br>2 454x6<br>4 274x4 1<br>6 54x7 1<br>6 6 5x8           | 550 700 T<br>500 760 L<br>550 640 L<br>,000 330 L<br>500 1,230 L                | Ορε. 16<br>Α. Κ. 16<br>Ορε. 17<br>Ορε. 18<br>Ορε. 18 | Wood & Chute Fay & Bowen Acadia Automatic      | 5 x634<br>5 x634<br>5 x634   | 1,400<br>850<br>400               | 1,300 L<br>450 L<br>800 .<br>1,425 L          | Dot.                          |
| 8<br>8<br>8<br>8<br>8<br>8<br>8<br>9<br>9<br>9<br>10 | Philadelphia<br>Regal<br>Roberts<br>Seattle Standard<br>Vulcan<br>Automatic<br>Hettinger<br>Le Roi<br>Regal<br>Acadia<br>Acme | 2 384x4 1<br>2 384x4<br>2 484x6<br>3 454x5<br>2 485x6<br>4 225x4 1<br>1 635x7<br>1 635x8<br>1 734x9 | 550 700 T<br>500 760 L<br>550 640 L<br>,000 330 L<br>500 1,230 L<br>450 1,200 H | Ορε. 16<br>Α. Κ. 16<br>Ορε. 17<br>Ορε. 18<br>Ορε. 18 | Wood & Chute Fay & Bowen Acadia Automatic Carl | 5 x634<br>5 x634<br>534x7<br>434x5                                       | 400<br>1,400<br>850<br>400<br>750 | 1,300 L<br>450 L<br>800 .<br>1,425 L<br>900 L | Dot.                          |
| 8<br>8<br>8<br>8<br>8<br>8<br>8<br>9<br>9<br>9       | Philadelphia<br>Regal<br>Roberts<br>Seattle Standard<br>Vulcan<br>Automatic<br>Hettinger<br>Le Roi<br>Regal<br>Acadia         | 2 334x4 1<br>2 334x4<br>2 454x6<br>3 454x5<br>2 454x6<br>4 274x4 1<br>6 54x7 1<br>6 6 5x8           | 550 700 T<br>500 760 L<br>550 640 L<br>,000 330 L<br>500 1,230 L                | Opt. 16 A. K. 16 Opt. 17 Opt. 18 Opt. 18             | Wood & Chute Fay & Bowen Acadia Automatic      | 5 x63/2<br>5 x63/2<br>5 x63/2<br>5 x63/2<br>5 x6<br>4 x5<br>5 x6<br>4 x5 | 1,400<br>850<br>400               | 1,300 L<br>450 L<br>800 .<br>1,425 L          | I. S.                         |

### Four-Cycle Marine Motors for 1921—(Continued)

| 16 to 20 Horsebower Four-Cycle M | ntare |
|----------------------------------|-------|

|       |                    |         |           |        | 1            |        |             |
|-------|--------------------|---------|-----------|--------|--------------|--------|-------------|
| Rated |                    |         | Bore &    | R.P.M. | Wr.          | Valves |             |
| H. P. |                    | Cyls.   | Stroke    |        |              |        | Ignition    |
| 18    | Harris             | 2       | 5%x61/2   | 500    | 1,750        | H      | M.          |
| 18    | Hettinger          | 2       | 614x8     | 425    | 1,600        | L      | A. K.       |
| 18    | Kermath            | 4       | 334x4     | 1,200  | 500          | L      | M.          |
| 18    | Murray & Tregurth  | a 2     | 63/2×8    | 425    | 1,867        | L      | Opt.        |
| 8     | Nieland            | 3       | 6 x7      | 375    | 1,600        | T      | M. & H.     |
| 8     | Palmer             | 2       | 63/8×8    | 400    | 1,600        | T      | A. K.       |
| 8     | Palmer             | 3       | 5 x6      | 600    | 1,000        | Ť<br>L | A. K.       |
| 8     | Regal              | 2 2     | 636x736   | 500    | 1,625        | L      | Opt.        |
| 18    | Scripps            | 2       | 414x6     | 900    | 700          | L      | M.          |
| 18    | Standard           | 2       | 6 x8      | 400    | 1,200        | L      | M. & B.     |
| N.    | Wisconsin          | 4       | 314x5     | 1,000  | 490          | L      | M.          |
| 20    | Acadia             | 2 2     | 61/2×8    | 450    | 1,760        |        | Opt.        |
| 261   | Acme               | 2       | 734 x9    | 340    | 2,925        | H      | Opt.        |
| 201   | Atlas Imperial     | 2       |           | 350    | 3,280        | H      | M. & B.     |
| 20    | Brennan            | 4       | 4 x5      | 1,000  | 600          | L      | B. & M.     |
| 20    | Buffalo            | 4       | 334×5     | 800    | 710          | L      | Dbl.        |
| 0     | du Pont            | 9       | 5 x61/2   | 750    | 1,250        | . н    | M.          |
| 20    | Enterprise         | 9       | 716x916   | 360    | 4,500        | H      | M. & B.     |
| 0     | Erd                | 4       | 4 ×6      | 1,000  |              | Ĥ      | М.          |
| 20    | Evansville         | A       | 5 x6      | 500    | 925          | H      | M.          |
| 20    | Foreman            | 9       | 536x7     | 500    | 1.250        | н      | B. & M.     |
| 20    | Frisco Standard    | 9       | 714x9     | 320    | 3,520        | T      | Opt.        |
| 20    | Guarantee          | 2 2 2 2 | 7 ×7      | 450    | 1,200        | Ĺ      | J. S.       |
| 20    | Hicks              | - 6     | 71/4×81/2 | 400    | 3,000        | Ĥ      | M. & B.     |
|       | Honest Clay        | 2       | 73/2×7    | 400    |              | Ĥ      | M. & D.     |
| 20    |                    | 2       | 729X7     | 800    | 2,150<br>550 |        | J. S.<br>M. |
| 20    | Hunter             |         | 3%x41/4   |        | 330          | L      | M. I. S.    |
| 20    | Knox Valve-in-head | 3 9     | 31/2×5    | 800    | 050          |        |             |
| 20    | Miller             | 9       | 312x5     | 900    | 650          | L      | M.          |
| 20    | Nieland            | 2       | 734x9     | 300    | 2,000        | L      | M. & III.   |
| 20    | Palmer             | - 4     | 412x6     | 600    | 1,150        | T      | A. K.       |
| 20    | Peerless           | 4       | 4 x6      | 600    | 750          | L      | M.          |
| 20    | Red Wing           | 4       | 31/2×41/2 | 700    | 670          | L      | M.          |
| 20    | Regal              | 4       | 436x536   | 600    | 985          | L      | J. S.       |
| 20    | Reliable Heer      | 2 opp.  | 6 x6      | 600    | 850          | H      | M.          |
| 20    | Seattle Standard   | 2       | 6 x7      | 525    | 1,250        | T<br>L | J. S.       |
| 20    | Twentieth Century  | 2       | 616x816   | 400    | 2,000        | L      | M.          |
| 20    | Union              | 2       | 736x9     | . 360  | 2,900        | L      | M. & B.     |
| 20    | Vulcan             | 4       | 514x7     | 500    | 1,300        | T      | J. S.       |
| 20    | Weight Reliable    | 9       | 8 -714    | 450    | 1 910        | Li     | MIS         |

21 to 30 Horsepower Four-Cycle Motors

|       |                      |       |                           |               | I              | ocation |                         |
|-------|----------------------|-------|---------------------------|---------------|----------------|---------|-------------------------|
| Ruted |                      |       | Bore &                    | n n 14        | ****           | of      | 24-141                  |
| H. P. |                      | Cyls. | Stroke                    | R.P.M.<br>500 | Wt.            | Valves  | ignition                |
| 21    | Lathrop              | 2     | 5 4x6½<br>7 x9            | 350           | 2,100          | L       | J. S.<br>Dы.            |
| 2     | Buffalo              |       |                           |               |                | ī       | M.                      |
| 22    | Miller .             | 4     | 41/4×6                    | 800           | 1,200          |         |                         |
| 12    | Vulcan               | 2     | 714x814                   | 425           | 2,100          | T       | J. S.                   |
| 2     | Wisconsin            | 4     | 3% x5                     | 1,000         | 523            | 2.      | M.                      |
| 12    | Wolverine            | 3     | 632x7                     | 425           | 1,980          | L       | M.                      |
| :4    | Anderson             | 4     | 5 x6                      | 500           | 1,600          | T       | M.                      |
| 14    | Automatic            | 4     | 51/2×7                    | 400           | 1,800          | L       | Opt.                    |
| 14    | Buffalo              | 4     | 5 x6½                     | 400           | 1,960          | L       | Dbl.                    |
| 14    | Carl                 | 4     | 5 x6                      | 650           | 1,250          | L       | J. S.                   |
| 14    | Dunn                 | 6     | 414×5                     | 800           | 625            | L       | ]. S.<br>]. S.<br>]. S. |
| 4     | Evansville           | 3     | 6 x634                    | 500           | 1,300          | H       | J. S.                   |
| 4     | Fisherman            | 4     | 5 x6                      | 550           | 1,500          | H       | J. S.                   |
| 4     | Mianus               | 3     | 6 x8                      | 400           | 2,200          | T       | One                     |
| 4     | Nieland              | 3     | 61/2×71/2                 | 325           | 2,000          | T       | M. & B.                 |
| 4     | Palmer               | 4     | 5 x6                      | 600           | 1.250          | T       | A. K.                   |
| 4     | Peerless             | 2     | 5%x7                      | 600           | 1,200          | T       | M.                      |
| 4     | Red Wing             | 4     | 3%x4%                     | 700           | 680            | Ĺ       | M.                      |
| 4     | Standard             | 4     | 5 x61/2                   | 450           | 1,600          | Ĩ.      | M. & B.                 |
| 4     | Wisconsin            | 4     | 4 x5                      | 1,000         | 556            | ĩ       | M.                      |
| 4     | Wood & Chute         | 3     | 6 x7                      | 400           | 1,700          | Ĩ.      | J. S.                   |
| 5     | Acme                 | 2     | 614×734                   | 600           | 2 250          | H       | Opt.                    |
| 5     |                      | 3     | 614x734                   | 375           | 2,250<br>2,550 | H       | Opt.                    |
|       | Acme                 | 2     |                           | 350           | 0.605          | Ĺ       | Opt.                    |
| 15    | Automatic            |       | 736x9                     |               | 2,625          | Ť       | Opt.<br>M.              |
| 15    | Doman                | 2     | 6 x7                      | 800           | 1,500          |         | M.                      |
| 5     | Frisco Standard      | . 3   | 614x7                     | 450           | 2,812          | T.      | Opt.                    |
| 5     | Frisbie Valve-in-hea |       | 6 x6                      | 600           | 1,050          | Н       | J. S.                   |
| 5     | Guarantee            | 4     | 514x514<br>314x5<br>714x9 | 600           | 1,500          | L       | J. S.<br>M.             |
| 5     | Gray                 | 4     | 334x5                     | 800           | 600            | Н       | М.                      |
| 5     | Hettinger            | 2     | 736x9                     | 375           | 2,500          | L       | A. K.                   |
| 25    | Honest Clay          | 4     | 536x7                     | 450           | 3,100          | H       | M. I. S.                |
| 25    | Kermath              | 4     | 4 x4                      | 1,200         | 535            | L       | M.                      |
| 25    | Knox                 | 2     | 7 x8                      | 550           | 1,900          | L       | 1. S.                   |
| 25    | Palmer               | - 2   | 736x10                    | 400           | 3,000          | L       | A. K.                   |
| 25    |                      | opp.  | 7 ×7                      | 450           | 1,800          | H       | M.                      |
| 25    | Sterling             | 4     | 3%x53/2                   | 1,000         | 600            | L       | M.                      |
| 25    | Superior             | 4     | 43/2×6                    | 750           | 000            | L       | I.S.                    |
| 25    | Vulcan               | 3     | 614x714                   | 475           | 1,800          | T       | J. S.                   |
| 26    | Palmer               | 3     | 63/-8                     | 400           | 2,000          | Ť       | A. K.                   |
| 26    | Waukesha             | 4     | 6%x8<br>3%x5%             | 1,000         | 615            | Ĺ       | M.                      |
| 27    |                      | 2     | 814×10                    | 320           | 3,975          | H       | Opt.                    |
|       | Acme                 | - 5   | SIZE                      | 600           | 1,800          | · T     | M.                      |
| 27    | Gaeth                |       | 51/2×8                    |               | 1,000          | Ĺ       | M t. D                  |
| 27    | Standard             | 3     | 6 x8                      | 400           | 1,800          |         | M. & B.                 |
| 28    | Lathrop              | - 4   | 5 4x61/2                  | 500           |                | T       | Opt.                    |
| 28    | Murray & Tregurth    |       | 612x8                     | 450           | 2,216          | L       | Opt.<br>M.              |
| 28    | Speedway             | 4     | 4 ×41/2                   | 1,200         | 200            | L       | M.                      |
| 28    | Trego Model 17       | 2     | 5 x8                      | 800           | 1,500          | H       | B. & M.                 |
| 30    | Acadia               | 3     | 61/218                    | 450           | 2,200          | 4.5     | Opt.                    |
| 30    | Atlas Imperial       | 2     |                           | 320           |                | H       | M. & B.                 |
| 30    | Automatic            | 4     | 5 x7                      | 550           | 1,800          | L       | J. S.<br>M.             |
| 30    | Bridgeport           | 3     | 614x714                   | 450           | 1,800          | L       | M.                      |
| 30    | Buffalo              | 4     | 6 x73/2                   | 350           | 2,525          | L       | Dbl.                    |
| 30    | Buffalo              | 4     | 4%x5                      | 800           | 929            | L       | Dbl.                    |
| 30    | Doak                 | 2     | 8 x10                     | 350           | 4.900          | H       | M.                      |
| 30    | Enterprise           | 2     | 9 x11                     | 320           | 4,750          | H       | M. & B.                 |
| 30    | Enterprise           | 3     | 6% x814                   | 400           | 5,000          | H       | M. & B.                 |
| 30    | Erd                  | 4     | 414x6                     | 1,000         | -1             | H       | M.                      |
| 30    | Frisbie Valve-in-he  |       | 4% x5                     | 800           | 725            | H       | J. S.                   |
| 30    |                      | 3     | 612-8                     | 360           | 4,125          | T       | Opt.                    |
|       | Frisco Standard      | 4     | 614x8                     | 500           | 2,000          | Ĥ       | M.                      |
| 30    | Harris               |       | 5% 161/2.                 |               |                | H       | M E D                   |
| 30    | Hicks                | 3     | 71/2×8<br>51/2×61/2       | 450           | 3,150          |         | M. & B.                 |
| 30    | Lathrop              | 3     | 073x073                   | 700           | 222            | T       | J. S.<br>J. S.<br>M.    |
| 30    | Lewis Ultra Six      | 6     | 334×5                     | 1,000         | 680            | LH      | 1. 5.                   |
| 30    | Miller               | 4     | 514×6                     | 700           | 1,500          | L       | M.                      |
| 30    | Regal                | 4     | 514x614                   | 600           | 1,550          | L       | J. S.                   |
| 30    | Vulcan               | 4     | 634x734                   | 475           | 2,100          | T       | J. S.<br>J. S.<br>M.    |
| 30    | Wisconsin            | 4     | 434×5                     | 1,000         | 612            | T       | M.                      |
| 30    | Weight Polichle      | - 9   | 734.40                    | 350           | 3.018          | H       | M. I. S.                |

31 to 40 Horsepower Four-Cycle Motors

| _              |                     |                 |                   |        | 1     | ocation |                   |
|----------------|---------------------|-----------------|-------------------|--------|-------|---------|-------------------|
| Rated<br>H. P. |                     | No. of<br>Cyls. | Bore &<br>Stroke  | R.P.M. | Wt.   | Valves  | Ignition          |
| 31             | Waukesha            | 4               | 4 x5%             | 1,000  | 825   | L       | M.                |
| 32             | Evansville          | 4               | 6 x634            | 500    | 1,425 | H       | I. S.             |
| 32             | Mianus              | 4               | 6 x8              | 400    | 2,750 | Ť       | Opt.              |
| 32             | Regal               | 4               | 434×534           | 1,000  | 800   | Ĺ       | J. S.             |
| 32             |                     | 2 opp.          | 734×8             | 450    | 2,000 | H       | M.                |
| 32             | Wolverine           | a opp.          | 735x9             | 375    | 3,490 | i.      | M.                |
| 32             | Wood & Chute        | 4               | 6 x7              | 400    | 2,300 | ĩ.      | J. S.             |
| 35             | Acme                | 3               | 714x9             | 350    | 4,075 | H       | Opt.              |
| 35             | Atlas Imperial      | 3               | 0 74 A.U          | 350    | 4,100 | H       | M. & B.           |
| 35             | Brennan             | 4               | 436x5             | 800    | 750   | i.      | B. & M.           |
| 35             |                     | 3               | 735x935           | 360    | 5,500 | н       | M. & B.           |
| 35             | Enterprise<br>Grav  | 4               | 4 x6              | 800    | 800   | H       | M.                |
| 35             | Hicks               | 3               | 734×9             | 450    | 4,300 | H       | M. & B.           |
| 35             | Honest Clay         | 4               | 63/2×7            | 450    | 3,300 | н       | M. I. S.          |
| 35             | Miller              | 4               | 534×734           | 550    | 1,900 | î.      | M.                |
| 35             |                     | 4               |                   | 1,000  | 995   | Ť       | J. S.             |
| 35             | Niagara<br>Palmer   | 4               | 4% x5½            | 400    | 2,400 | Ť       | A. K.             |
| 35             |                     | 3               | 634x8             | 400    | 3,500 | Ť       | A. K.             |
| 35             | Palmer              | 4               | 73%×10<br>5 ×6    | 600    | 850   | i.      | M                 |
| 35             | Peerless            | 4               |                   | 900    | 1,050 | ĩ       | M.                |
| 35             | Scripps             | 1               | 414x6             | 1,000  | 850   | ĩ       | M.                |
| 35             | Treiber<br>Union    | 3               | 434x6<br>734x9    | 360    | 4,825 | Ť       | M. & B.           |
| 35             | Vulcan              | 3               | 736x836           | 425    | 2,850 | Ť       | J. S.             |
|                | Carl                | 4               | 637-6             | 400    | 2,990 | Ĺ       | A. K.             |
| 36<br>36       |                     | 4               | 6%x8              | 600    | 2,000 | Ť       | M.                |
|                | Gaeth<br>Gray-Prior | 4               | 514x8             | 700    | 1,000 | Ĺ       | J. S.             |
| 36             |                     | 4               | 416x8             | 425    | 3,100 | Ĭ.      | A. K.             |
| 36             | Hettinger           | 4               | 63/2×8<br>4 1/4×5 | 1,000  | 610   | Ĩ.      | M.                |
| 36<br>36       | Red Wing            | 4               | 612-71/           | 500    | 2,700 | L       | J. S.             |
|                | Regal<br>Waukesha   | 4               | 634x734           | 1,000  | 840   | ĩ       | M.                |
| 36             | Automatic           | 3               | 4%x5%<br>734x9    | 350    | 3,465 | ī.      | Opt.              |
| 37<br>37       | Standard            | 4               | 6 x8              | 400    | 2,800 | î.      | M. & B.           |
| 40             | Acadia              | 4               | 61/4×8            | 450    | 2,600 | -       | Opt.              |
| 40             | Acadia              | 4               | 5 x61/2           | 1,050  | 1,200 | **      | J. S.             |
| 40             | Acme                | 3               | 614x714           | 600    | 2,550 | H       | Opt.              |
| 40             | Acme                | 4               | 614×714           | 450    | 3,475 | H       | Opt.              |
| 40             | Automatic           | 4               | 536x7             | 550    | 1,850 | i.      | LS                |
| 40             | Brennan             | 4               | 43/2×5            | 1,200  | 700   | ĩ.      | J. S.<br>B. & M.  |
| 40             | Brennan *           | 4               | 5 x5              | 1,000  | -850  | ĩ.      | B. & M.           |
| 40             | Brennan             | 6               | 436x5             | 750    | 950   | ĩ       | B. & M.           |
| 40             | Doak                | 3               | 734 x9            | 375    | 5,600 | Ĥ       | M.                |
| 40             | Doman               | 4               | 434×6             | 900    | 1,200 | T       | M.                |
| 40             | du Pont             | 4               | 516×6             | 750    | 1,850 | Ĥ       | M.                |
| 40             | Erd                 | 4               | 514x6<br>414x6    | 1,000  | 25000 | H       | M.                |
| 40             | Fay & Bowen         | 4               | 434×51/2          | 1,400  | 700   | L       | M.                |
| 40             | Fav & Bowen         | 4               | 4%x53%            | 1,000  | 950   | Ī.      | M.                |
| 40             | Foreman             | 4               | 534×7             | 500    | 1,250 | H       | B. & M.           |
| 40             | Frisbie Valve-in-he | ad 4            | 6 x6              | 600    | 1,200 | H       | J. S.             |
| 40             | Frisco Standard     | 3               | 8 x10             | 320    | 5,780 | T       | Opt.              |
| 40             | Imperial            | 4               | 614x8             | 450    | 2,600 | Ĺ       | I.S.              |
| 40             | J. V. B.            | 4               | 436×6             | 800    | 1,450 | H       | J. S.<br>M. I. S. |
| 40             | Kermath             | 4               | 41/41614          | 1,200  | 1,350 | L       | M.                |
| 40             | Knox (Valve-in-hea  | ad) 4           | 5 x53/2           | 800    | 950   | н       | B. & M.           |
| 40             | Lathrop             | 4               | 51/4×61/2         | 700    | 000   | T       | I. S.             |
| 40             | Murray & Tregurt    | ha 4            | 634x8             | 450    | 2,916 | Ĺ       | J. S.<br>Opt.     |
| 40             | Red Wing            | 4               | 43/2×5            | 1,000  | 650   | ĩ       | M.I.              |
| 40             | Vulcan              | 6               | 534x7             | 550    | 1,900 | Ť       | I. S.             |
| 40             | Waukesha            | 4               | 434x634           | 1,000  | 910   | Ĺ.      | J. S.             |
| 40             | Wisconsin           | 4               | 434 x532          | 1,000  | 787   | Ť       | M.                |
| 40             | Wolverine           | 4               | 536x7             | 800    | 1,500 | i.      | M.                |
| 40             | Wright Reliable     | 4               | 6 x71/2           | 450    | 3,142 | H       | M. I. S.          |

42 to 50 Horsepower Four-Cycle Motors

|        | OLC BILL  | 200   | 2,700 | 2.2 | 0. 0.    | 1     | 72 10 00 11                 | Lorsep | ULUU1 1         | Um - Uj  | C 0 C AV | 101013  |                      |
|--------|-----------|-------|-------|-----|----------|-------|-----------------------------|--------|-----------------|----------|----------|---------|----------------------|
| 2      | 614×714   | 600   | 2,250 | H   | Opt.     | 1     |                             |        |                 |          |          | ocation |                      |
| 3      | 614x71/2  | 375   | 2,550 | H   | Opt.     |       |                             | **     | D 0.            |          |          |         |                      |
| 2      | 735x9     | 350   | 2,625 | L   | Opt.     | Rated |                             |        | Bore &          |          |          | of      | **-1-1               |
| 2      | 6 x7      | 800   | 1,500 | T   | M.       | H. P. | Motor                       | Cyls.  | Stroke          | R.P.M.   | Wt.      | Valves  | Ignition             |
| 3      | 614x7     | 450   | 2,812 | T   | Opt.     | 42    | Wisconsin                   | 6      | 434×5           | 1,000    | 826      | T       | M.                   |
| ead 3  | 6 x6      | 600   | 1,050 | H   | J. S.    | 42    | Wolverine                   | 3      | 816x9           | 375      | 3,660    | L       | M.                   |
| 4      | 514x514   | 600   | 1,500 | L   | 1. S.    | 44    | Speedway .                  | 4      | 436x536         | 1,200    | 950      | L       | M.                   |
| 4      | 332x5     | 800   | 600   | H   | M.       | 45    | Acme                        | 3      | 814×10          | 325      | 5,050    | H       | Opt.                 |
| 2      | 715x9     | 375   | 2,500 | L   | A. K.    | 45    | Atlas Imperial              | 3      |                 | 335      |          | H       | M. & B.              |
| 4      | 536x7     | 450   | 3,100 | H   | M. I. S. | 45    | Automatic                   | 6      | 5 ×7            | 550      | 2,500    | 1       | J. S.                |
|        |           |       | 535   | L   | M. 1. 5. | 45    | Bridgeport                  | 9      | 71/4×9          | 375      | 3,200    | 1       | M.                   |
| 4      | 4 x4      | 1,200 |       |     | I. S.    | 45    | Buffalo                     | 4      | 7 x9            | 350      | 3,655    | 1       | Dbl.                 |
| 2      | 7 x8      | 550   | 1,900 | L   | J. S.    |       |                             | - 4    |                 | 350      | 5,500    | H       | M.                   |
| - 2    | 736x10    | 400   | 3,000 |     | A. K.    | 45    | Doak                        | 3      | 8 x10           |          | 0,000    |         |                      |
| 2 opp. | 7 x7      | 450   | 1,800 | H   | M.       | 45    | Enterprise                  | 3      | 814x1014        | 340      | 6,750    | н       | M. & B.              |
| 4      | 3%x532    | 1,000 | 600   | L   | M.       | 45    | Erd                         | 4      | 434×6           | 1,000    |          | H       | M.                   |
| 4      | 43/2×6    | 750   |       | L   | J. S.    | 45    | Fay & Bowen                 | 4      | 5 x61/4         | 1,000    | 1,095    | T       | M.                   |
| 3      | 614x714   | 475   | 1,800 | T   | J. S.    | 45    | Gray.                       | 4      | 434×6           | 800      | 1,100    | H       | M.                   |
| 3      | 63/4×8    | 400   | 2,000 | T   | A. K.    | 45    | Reliable                    | 2 opp. | 934×10          | 350      | 4,000    | н       | M.                   |
| 4      | 334×534   | 1,000 | 615   | I.  | M.       | 45    | Scripps                     | 6      | 434×6           | 900      | 1,300    | L       | M.                   |
| 2      | 814×10    | 320   | 3,975 | H   | Opt.     | 45    | Union                       | 3      | 834x1034        | 330      | 6,450    | T       | M. & B.              |
| 3      | 51/2×8    | 600   | 1,800 | · T | M.       | 45    | Vulcan                      | 4      | 716x816         | 425      | 3,400    | T       | J. S.                |
|        |           | 400   | 1,800 | i.  | M. & B.  | 45    | Wright Reliable             | 3      | 71/2×9          | 350      | 4.068    | Ĥ       | M. I. S.             |
| 3      | 6 x8      |       | 1,500 | Ť   |          | 46    | Wisconsin                   | 4      | 5.1x51/2        | 1,000    | 795      | T       | M.                   |
| . 4    | 5 4x61/2  | 500   |       | 1   | Opt.     | 50    |                             | 7      |                 | 375      | 5,160    | Ĥ       | Opt.                 |
| tha 3  | 61/2×8    | 450   | 2,216 | L   | Opt.     |       | Acme                        |        | 734×9           |          | 0,100    | H       | M. & B.              |
| 4      | 4 ×41/2   | 1,200 | 560   | L   | M        | 50    | Atlas Imperial              | - 4    |                 | 380      | 5,800    |         |                      |
| 2      | 5 x8      | 800   | 1,500 | H   | B. & M.  | 50 .  | Anderson                    | 4      | 7 x83%          | 450      | 2,900    | T       | M.                   |
| 3      | 61/2x8    | 450   | 2,200 | **  | Opt.     | 50    | Automatic                   | 4      | 734×9           | 350      | 4,430    | L       | Opt.                 |
| 2      |           | 320   |       | H   | M. & B.  | 50    | Automatic                   | 4      | 634x8           | 500      | 3,000    | L       | J. S.                |
| 4      | 5 x7      | 550   | 1,800 | L   | J. S.    | 50    | Brennan                     | - 6    | 432x5           | 1,200    | 850      | L       | B. & M.              |
| 3      | 614x714   | 450   | 1,800 | L   | M.       | 50    | Doman                       | 4      | 6 x7            | 800      | 2,000    | T       | M.                   |
| 4      | 6 x735    | 350   | 2,525 | I.  | Dbl.     | 50    | Fay & Bowen                 | 6      | 436x536         | 1,000    | 900      | T       | M.                   |
| 4      | 4%x5      | 800   | 929   | ī   | Dbl.     | 50    | Frisbie Valve-in-           | head 6 | 434×5           | 900      | 985      | H       | J. S.                |
| 2      | 8 x10     | 350   | 4,900 | H   | M.       | 50    | Frisco Standard             | 3      | 834×1034        |          | 7,650    | H       | Opt.                 |
| 2      |           | 320   | 4,750 | Ĥ   | M. & B.  | 50    | Gaeth                       | 4      | 514x8           | 800      | 2,000    | Ť       | M.                   |
|        |           |       |       | H   | M. & B.  | 50    | Guarantee                   | 4      | 7 x834          | 450      | 3,000    | Ĺ       | J. S.                |
| 3      | 6% x814   | 400   | 5,000 |     |          | 50    | Harris                      | - 2    | 5%x61/2         | 500      | 2,260    | H       | M.                   |
| . 4    | 414×6     | 1,000 | 111   | н   | M.       |       |                             |        |                 | 375      | 4,500    | **      | A. K.                |
| read 4 | 4%x5      | 800   | 725   | H   | J. S.    | 50    | Hettinger                   | 9      | 736x9           |          | 4,000    | н       | A. A.                |
| 3      | 614x8     | 360   | 4,125 | T   | Opt.     | 50    | Honest Clay                 | 2      | 834x10          | 350      |          |         | M. I. S.<br>M. I. S. |
| 4      | 5% x61/20 | 500   | 2,000 | н   | M.       | 50    | Honest Clay                 | 4      | 73%x7           | 450      | 3,600    | н       | M. I. S.             |
| 3      | 734×8     | 450   | 3,150 | H   | M. & B.  | 50    | Knox                        | 4      | 7 x8            | 550      | 3,300    | L       | J. S.                |
| 3      | 514x614   | 700   |       | T   | J. S.    | 50    | Miller                      | 4      | 6 x9            | 450      | 2,700    | L       | M.                   |
| 6      | 336×5     | 1,000 | 680   | LH  | J. S.    | 50    | Palmer                      | 4      | 716×10          | 400      | 4,200    | T       | A. K.                |
| A      | 514x6     | 700   | 1,500 | L   | M.       | 50    | Peerless                    | 4      | 714×10<br>534×7 | 600      | 1,700    | T       | M.                   |
| 4      |           | 600   | 1,550 | 1   | IS       | 50    | Regal                       | 4      | 734x9           | 450      | 4,800    | Ĩ.      | J. S.                |
| 4      | 514×61/2  |       |       | Ť   | J. S.    | 50    | Contact                     | 4      | 434×6           | 1.500    | 1,000    | ĩ.      | M.                   |
| 4      | 61/4×71/4 | 475   | 2,100 | Ť   | . S.     |       | Scripps<br>Twentieth Centus | 4      | 61/2×81/2       | 450      | 3,400    | ī       | Dbl.                 |
| 4      | 434×5     | 1,000 | 612   |     | M.       | 50    |                             | 19 4   | 5 x634          | 1,000    | 980      | Y       | M.                   |
| 2      | 735×9     | 350   | 3,018 | H   | M. I. S. | 50    | Waukesha                    | 10     |                 |          | non      | L       | 200                  |
| 3      | 6 x732    | 450   | 2,416 | H   | M. I. S. | 11    |                             | (Cont  | inued on        | page 88) |          |         |                      |
|        |           |       |       |     |          |       |                             |        |                 |          |          |         |                      |

## Heavy Oil Marine Motors for 1921

The ignition systems used on these heavy oil engines are very different from those common to the gasoline engines. The abbreviations used in the tables have the following meanings: Hot Bulb, the ignition employed on engines generally using so-called low compression pressures and requiring a heated ball or surface of some kind to ignite the charge; Semi-Diesel, this type also uses a heated surface for ignition, but uses different methods of fuel injection; Comp., ignition on these is entirely due to the heat of compression of the air in the cylinders, high pressure being necessary. H, under location of valves, refers to their location in the head

| hd | Motor                |        | Bore &        | R.P.M.     | Wt.    | 2 or 3<br>Port | Ignition |
|----|----------------------|--------|---------------|------------|--------|----------------|----------|
|    | Missouri             | Cyla.  | Stroke        |            |        | 3              | Hot Bulb |
|    |                      | 1      | 5 x6          | 500        | 675    |                | Hot Bulb |
|    | Remington            | 1      | 536×6         | 500        | 800    | 3              |          |
|    | Mianus               | 1      | 5 x x 656     | 500        | 900    | 2              | Comp.    |
|    | Skandia              | 1      | 653x634       | 500        | 1,325  | 2              | Hot Bulb |
|    | G. G.                | 1      | 634 x8        | 480        | 1,760  | 3              | Comp.    |
|    | Remington            | 1      | 6%×6          | 500        | 825    | 3              | Hot Bulb |
|    | Remington            | 1      | 7 x8          | 400        | 1,500  | 3              | Hot Bulb |
|    | G.IG.                | 1      | 736x936       | 400        | 2,000  | 3              | Comp.    |
|    | Remington            | 2      | 536x6         | 500        | 1,050  | 3              | Hot Bulb |
|    | Mianus               | 2      | 5 Ax65%       | 500        | 1,600  | 2              | Comp.    |
|    | Mietz                | 1      |               |            |        | * *            | Hot Bulb |
|    | Skandia              | 1      | 814x914       | 400        | 2,750  | 2              | Hot Pulb |
|    | Remington .          | 1      | 8% x8         | 400        | 1,600  | 3              | Hot Bulb |
|    | Venn Severin         | 1      | 8 x10         | 400        | 1,875  | 2              | Hot Bulb |
|    | Missouri             | 3      | 5 x6          | 500        | 1,650  | 3              | Hot Bulb |
|    | Remington            | 2      | 634×6         | 500        | 1,100  | 3              | Hot Bulb |
|    | Remington            | 3      | 534x6         | 500        | 1,600  | 3              | Hot Bulb |
|    | Remington            | 2      | 7 x8          | 400        | 2,100  | 3              | Hot Bulb |
|    | Skandia              | 1      | 9 x11         | 375        | 3,750  | 2              | Hot Bulb |
|    | Venn Severin         | 1      | 936x11        | 400        | 2,150  | 2              | Hot Bulb |
|    | Fairbanks Morse      | C.O. 2 | 834x10        | 400        | 6,855  | 2              | Hot Bulb |
|    | G. G.                | 2      | 834x934       | 450        | 9,000  | 3              | Comp.    |
|    | Mietz                | 2      | 0/200/2       |            | 9,000  |                | Hot Bulb |
|    | Mianus               | 2      | 7 Ax936       | 360        | 5,000  | 2              | Comp.    |
|    | Missouri             | ă.     | 5 x6          | 500        | 2,300  | 3              | Hot Bulb |
|    | Remington            | 4      | 534x6         | 500        | 1,750  | 3              | Hot Bulb |
|    | Remington            | 3      | 634×6         | 500        | 1.850  | 3              | Hot Bulb |
|    | Remington            | 2      | 934×8         | 400        | 3,130  | 3              | Hot Bulb |
|    | Kahlenberg           | 2      |               | 375        | 6,000  | 2              | Hot Bulb |
|    |                      | 3      | 834x9<br>7 x8 |            | 3,400  | 3              | Hot Bulb |
|    | Remington<br>Skandia | 2      |               | 400<br>375 |        | 2              | Hot Bulb |
|    |                      | 2      | 8%×10         |            | 5,450  | _              | Hot Bulb |
|    | Bolinders            |        |               | 425        | 5,225  |                | Hot Bulb |
|    | Venn Severin         | 00 2   | 8 x10         | 400        | 3,380  | 2              | Hot Rulb |
|    | Fairbanks Morse      | C.O. 3 | 814×10        | 400        | 6,945  | 2              | Hot Bulb |
|    | G. G.                | 2      | 914x11        | 380        | 11,000 | 3              | Comp.    |
|    | Mianus               | 3      | 71xx93%       | 360        | 6,400  | 2              | Comp.    |
| è  | Mietz                | 3      |               |            |        | * 1            | Hot Bulb |
|    | Venn Severin         | 1      | 1214×1214     | 300        | 3,950  | 2              | Hot Bulb |
|    | Venn Severin         | 2      | 935×11        | 400        | 4,000  | 2              | Hot Bulb |
|    | Weiss                | 3      |               | 425        | 4,500  | * 1            | Opt.     |
|    | Remington            | 4      | 634×6         | 500        | 2,000  | 3              | Hot Bulb |
|    | Bolinders            | 2      |               | 375        | 7,040  |                | Hot Bulb |
|    | Lauier               | 1      | 1336x15%      | 300        | 10,000 | 2              | Hot Bulb |
|    | Kahlenberg           | 3      | 816x9         | 375        | 8,000  | 2              | Hot Bulb |

| 73%                                    | Mianus 1                           | 5 4 x 656<br>655 x 632<br>634 x 8  | 500        | 900  | 2   | Comp.                        |
|--|------------------------------------|--|------------|--|-----|------------------------------|
| 9                                      | Skandia 1                          | 653x634  | 500        | 1,325  | 2   | Hot Bulb                     |
|  | G. G. 1                            | 634 x8   | 480        | 1,760  | 3   | Comp.<br>Hot Bulb            |
| 10                                     | Remington 1                        | 074 X 0  | 500        | 826  | 3   | Hot Bulb                     |
| 11                                     | Remington 1                        | 7 18   | 400        | 1,500  | 3   | Hot Bulb                     |
| 14 .                                   | G.1G. 1<br>Remington 2             | 736x936  | 400<br>500 | 2,000<br>1,050                                 | 3   | Comp.<br>Hot Bulb            |
| 15                                     | Mianus 2                           | 536×6<br>54×65%  | 500        | 1,600  | 2   | Comp.                        |
| 15                                     | Mietz 1                            | 0184078  |            | .,   |     | Comp.<br>Hot Bulb            |
| 16                                     | Skandia 1                          | 814×914  | 400        | 2,750  | 2   | Hot Rulb                     |
| 17                                     | Remington . 1                      | 894 x8   | 400        | 1.600  | 3   | Hot Bulb                     |
| 20                                     | Venn Severin 1                     | 8 x10  | 400        | 1,875<br>1,650                                 | 2   | Hot Bulb                     |
| 22                                     | Missouri 3                         | 5 x6   | 500        | 1,650  | 3   | Hot Bulb                     |
| 22                                     | Remington 2<br>Remington 3         | 634×6  | 500<br>500 | 1,100  | 3   | Hot Bulb                     |
| 24                                     | Remington 3<br>Remington 2         | 5) 2x6<br>7 x8   | 400        | 1,600<br>2,100<br>3,750                        | 3   | Hot Bulb                     |
| 24                                     | Skandia 1                          | 0 +11  | 375        | 3.750  | 2   | Hot Bulb                     |
| 25                                     | Venn Severin 1                     | 936x11   | 400        | 2,150  | 2   | Hot Bulb                     |
| 30                                     | Fairbanks Morse C.O. 2             | 914x11<br>814x10<br>814x914  | 400        | 6,855  | 2   | Hot Bulb                     |
| 30                                     | G. G. 2                            | 834x934  | 450        | 9,000  | 3   | Comp.<br>Hot Bulb            |
| 30                                     | Mietz 2                            | 91.07/   | 200        | # 000  | 2   |                              |
| 30                                     | Mianus 2<br>Missouri 4             |  | 360<br>500 | 5,000  | 3   | Comp.<br>Hot Bulb            |
| 32                                     | Remington 4                        | 534x6  | 500        | 2,300<br>1,750<br>1,850                        | 3   | Hot Bulb                     |
| 34                                     | Remington 3                        | 634×6  | 500        | 1.850  | 3   | Hot Bulb                     |
| 35                                     | Remington 2                        | 934×8  | 400        | 3,130  | 3   | Hot Bulb                     |
| 36                                     | Kahlenberg 2                       | 834x9  | 375        | 6,000<br>3,400                                 | 2   | Hot Bulb                     |
| 37                                     | Remington 3                        | 7 ×8   | 400        | 3,400  | 3   | Hot Bulb                     |
| 38                                     | Skandia 2                          |  | 375        | 5,450  | 2   | Hot Bulb                     |
| 40                                     | Bolinders 2<br>Venn Severin 2      |  | 425<br>400 | 5,225<br>3,380                                 | 2   | Hot Bulb<br>Hot Bulb         |
| 40<br>45                               | Fairbanks Morse C.O. 3             |  | 400        | 6.945  | 2   | Hot Bulb                     |
| 45                                     | G. G. 2                            | 914x11   | 380        | 6,945<br>11,000                                | 3   | Comp.                        |
| 45                                     | Mianus 3                           | 77xx9%   | 360        | 6,400  | 2   | Comp.                        |
| 45                                     | Mietz 3                            |  |            |  |     | Comp.<br>Hot Bulb            |
| 45                                     | Venn Severin 1                     | 1214×1214  | 300        | 3,950  | 2   | Hot Bulb                     |
| 45                                     | Venn Severin 2                     |  | 400        | 4,000  | 2   | Hot Bulb                     |
| 45                                     |                                    |  | 425<br>500 | 4,500  | 3   | Opt.<br>Hot Bulb             |
| 46<br>50                               | Remington 4<br>Bolinders 2         |  | 375        | 7.040  |     | Hot Bulb                     |
| 50                                     | Laujer 1                           | 191/-151/  | 300        | 2,000<br>7,040<br>10,000                       | 2   | Hot Bulb                     |
| 54                                     | Kahlenberg 3                       | 834x9<br>1034x1134<br>834x10<br>1034x1234<br>834x934<br>10 x1034   | 375        |  | 2   | Hot Bulb                     |
| 55                                     | Skandia 2                          | 1014x1114  | 375        | 7,800<br>9,140<br>15,000                       | 2   | Hot Bulb                     |
| 60                                     | Fairbanks Morse C.O. 4             | 814x10   | 400        | 9,140  | 2   | Hot Bulb                     |
| 60                                     | G. G. 2                            | 1014x1214  | 360        | 15,000   | 3   | Comp.                        |
| 60                                     | G. G. Kahlenberg                   | 8/9x9/9  | 450<br>340 | 12,500<br>3,500                                | 3 2 | Comp.<br>Hot Bulb            |
| 60                                     | Kahlenberg<br>Mianus               | 7 18 x 9 3/6   | 360        | 8,000  | 2   | Comp                         |
| 60                                     | Mietz                              |  | 000        | 0,000  |     | Comp.<br>Hot Bulb            |
| 60                                     | Weiss                              |  | 385        | 6,000  |     | Opt.                         |
| 65                                     | Bolinders                          |  | 350<br>375 | 9,750<br>10,000                                |     | Hot Bulb                     |
| 70                                     | Kahlenberg                         |  | 375        | 10,000   | 2   | Hot Bulb                     |
| 70                                     | Venn Severin                       |  | 400        | 4,800  | 2   | Hot Bulb                     |
| 70                                     | Skandia<br>Fairbanks Morse C.O.    | 11 x14<br>101/4x121/4  | 325<br>340 | 9,250<br>14,670                                | 2 2 | Hot Bulb                     |
| 75<br>75                               | Mietz                              | 107911278  | 310        | 14,010   | -   | Hot Bulb<br>Hot Bulb         |
| 75                                     | Remington .                        | 8%x8   | 400        | 5,430  | 3   | Hot Bulb                     |
| 75                                     | Weiss                              | 1  | 360        | 7,500  | **  | Opt.                         |
| 90                                     | Bolinders                          |  | 300        | 11,200<br>16,000                               | **  | Hot Bulb                     |
| 98                                     | G. G.                              | 9½x11  | 380        | 16,000   | 3   | Comp.<br>Hot Bulb            |
| 90                                     | Kahlenberg<br>Fairbanks Morse C.O. | 3 10 x1014   | 340        | 10,000   | 2 2 |                              |
| 100                                    | Lazier                             | 10 12 12 13 15 14 12 14 13 14 13 14 13 14 13 14 13 14 13 14 14 13 14 14 14 14 14 14 14 14 14 14 14 14 14 | 250<br>300 | 17,410<br>19,000<br>9,700<br>17,300            | 2   | Hot Bulb                     |
| 100<br>100<br>120<br>120<br>120<br>120 |                                    | 1234×1334  | 300        | 9,700  | 2   | Hot Bulb                     |
| 120                                    | Bolinders                          |  | 250        | 17,300   |     | Hot Bulb                     |
| 120                                    |                                    | 4 10 x101/2  | 340        | 15,000   | 2   | Hot Bulb                     |
| 120                                    |                                    | 2 14 ×15%  | 300        | 17,500   | 2   | Hot Bulb                     |
| 120                                    | Weiss<br>G. G.                     | 1012-1214  | 300<br>340 | 15,000<br>17,500<br>12,000<br>22,000           | 3   | Opt.<br>Hot Bulb             |
| 140                                    | Skandia                            | 4 1035x1235<br>4 11 x14  | 325        | 16,000   | 2   | Hot Bulb                     |
| 150                                    |                                    | 3 14 +18   | 250        | 32,259   | 2   | Hot Bulb                     |
| 150                                    | Lazier                             | 3 1314×15%   | 300        | 32,259<br>25,000                               | 2   | Hot Bulb                     |
| 150                                    | Venn Severin                       | 3 13½×15¾<br>3 12½×13½   | 300        | 14,500   | 2   | Hot Bulb                     |
| 150                                    |                                    | d  | 280        | 15.500   |     | Opt.                         |
| 160                                    |                                    | 2 1187-14  | 225<br>300 | 23,000   | 3   | Hot Bulb                     |
| 180                                    | G. G.<br>Skandia                   | 4 11%x14<br>2 16%x19   | 250        | 23,000<br>38,000<br>25,500                     | 2   | Comp.<br>Hot Bulb            |
| 200                                    |                                    | 4 14 x18   | 250        | 34,200   | 2   | Hot Bulb                     |
| 200                                    | Lazier                             | 6 1334x1534  | 300        | 50,000   | 2 2 | Hot Bulb                     |
| 200                                    | Venn Severin                       | 4 14 x18<br>6 13½x15¾<br>4 12½x13½   | 300        | 18,700   | 2   | Hot Bulb                     |
| 200<br>200<br>200<br>200               | Weiss                              |  | 280        | 25,500<br>34,200<br>50,000<br>18,700<br>20,000 |     | Opt.                         |
| 225                                    |                                    | 3  | 258        | 22,000   |     | Opt.                         |
| 240                                    | Bolinders<br>G. G.                 | 4 13½×15   | 250<br>280 | 22,000<br>33,700<br>48,000                     | 3   | Hot Bulb                     |
| 240                                    | Skandia                            | 4 14 x15%  | 300        | 32,000   | 2   | Comp.<br>Hot Bulb            |
| 300                                    | Lazier                             | 6 13½x15¾  | 300        | 50,000   | 2   | Hot Bulb                     |
| 300                                    | Weiss                              |  | 258        | 30,000<br>38,725                               |     | Opt.<br>Hot Bulb             |
| 300                                    | Fairbanks Morse C.O.               | 6 14 x18   | 250        | 38,725   | 2   | Hot Bulb                     |
| 320                                    | Bolinders                          | 1616-10  | 225        | 45,600   | 2   | Hot Bulb                     |
| 350                                    | Nordhore                           | 4 163/2×19<br>4 15 ×20   | 250<br>200 | 46,000   | 2   | Hot Bulb                     |
| 380                                    |                                    | A  | 245        | 115,000<br>40,000                              | **  | Opt.<br>Hot Bulb<br>Hot Bulb |
| 400<br>500                             | Bolinders                          | 4  |            | 101,600  | **  | Hot Bulb                     |
| 500                                    | Skandia                            | 6 1636x19  | 250        | 70,000   | 2   | Hot Bulb                     |
| 500<br>600<br>650                      | Nordberg                           | 6 15 x20   | 200        | 155,000  |     |                              |
| 650                                    |                                    |  | 165        | ***  | **  | Comp.                        |
| 975                                    | Busch Suizer                       | 6 17 x27<br>4 20%(x36  | 165        | 0.00   |     | Comp.                        |
| 1,000                                  | Nordberg<br>Busch Sulzer           | 4 20% x36<br>4 22 x34  | 130<br>135 |  | * * | Comp.                        |
| 1,100                                  |                                    | 6 22 x34   | 135        | ***  |     | Comp.                        |
| 1,500                                  | Nordberg                           | 6 20% x36  | 130        | 480,000  |     |                              |
|  |                                    |  |            |  |     |                              |

|   | Rated<br>H. P. | Motor        | No. of<br>Cyls. |    | ore & | R.P.N | 1. | Wt.   | 2 or 3<br>Port | Ignition |
|---|----------------|--------------|-----------------|----|-------|-------|----|-------|----------------|----------|
| ı | 1,800          | Busch Sulzer | 4               | 28 | x44   | 105   |    |       |                | Comp.    |
|   | 2,000          | Nordberg     | 4               | 28 | ×48   | 110   | 63 | 0,000 |                |          |
|   | 3,000          | Busch Sulzer | 6               | 28 | ×44   | 105   |    |       |                | Comp.    |
|   | 3,000          | Nordberg     | 5               | 28 | ×48   | 110   | 95 | 0,000 |                | *******  |

#### Four-Cycle Heavy Oil Engines

| H. P.   Motor   Cyls   Stroke   R.P.M.   Wt.   Valves   Igni   |          | Location | 1       |     |         |       |                  |       |
|--|----------|----------|---------|-----|---------|-------|------------------|-------|
| 12Start   1  | of       |          |         |     |         |       |                  | Rated |
| 25   |          |          |         |     |         |       |                  |       |
| 25   |          |          |         |     | 6% x9   |       |                  |       |
| 30   |          |          | 4,800   |     |         |       |                  |       |
| 374   Dodge  |          |          |         |     |         |       |                  |       |
| 50   |          |          |         |     |         | 4     |                  |       |
| 50   |          |          |         |     | 6% x9   |       |                  |       |
| 50   |          |          |         |     | 6% x9   |       |                  |       |
| 50   Western   2   9/4x14   325   12,940   H   Con   |          |          | 10,000  |     | 8 x9    | 3     |                  |       |
| 60 Midweat Diesel 2 9 x13 350 14,000 Con 75 Pittsburgh 3 834x12 400 15,500 H Con 75 Pittsburgh 3 834x14 325 16,750 H Con 75 Pittsburgh 3 834x14 325 16,750 H Con 100 Pittsburgh 4 834x14 325 16,750 H Con 100 Pittsburgh 4 834x12 400 13,000 L Con 100 Pittsburgh 4 834x12 400 18,000 H Con 120 Midweat Diesel 4 9 x123x2 350 25,000 H Con 120 Midweat Diesel 4 9 x123x2 350 25,000 H Con 120 Midweat Diesel 4 9 x123x2 350 17,400 H Con 150 Western 6 83x3 350 35,000 H Con 150 Western 6 93x3 350 35,000 H Con 150 Western 6 93x3 350 35,000 H Con 180 Midweat Diesel 6 9 x123x2 350 22,820 H Con 220 Ingersoll Rand P. R.  Type 6 11 x15 350 40,000 C Con 320 Nelseco Diesel 8 9 x123x2 350 28,375 H Con 320 Dow 6 12 x18 250   |          | H        | 12,000  |     |         | 2     | Pittsburgh       |       |
| 75   |          |          |         |     |         | 2     |                  |       |
| 75   |          |          | 14,000  | 350 |         | 2     | Midwest Diesel   | 60    |
| 75   |          | L        | 11,000  |     |         | 4     | Fulton           | 70    |
| 75 Pittsburgh 3 834312 400 15,500 H Con 75 Westerm 3 914x14 325 16,750 H Con 100 Fulton 6 8 x0 400 13,000 L Con 100 Pittsburgh 4 814x12 400 18,000 H Con 100 Westerm 4 914x14 325 20,000 H Con 120 Midwest Diesel 4 9 x13 350 25,000 Con 120 Nelseco Diesel 4 9 x13 350 25,000 Con 150 Pittsburgh 6 814x12 400 24,000 H Con 150 Western 6 914x14 325 27,000 H Con 150 Western 6 914x14 325 27,000 H Con 180 Nelseco Diesel 6 9 x13 350 35,000 Con 180 Nelseco Diesel 6 9 x13 350 35,000 Con 180 Nelseco Diesel 6 9 x13 350 35,000 Con 180 Nelseco Diesel 6 9 x12 350 22,820 H Cor 220 Ingersoll Rand P. R.  Type 6 11 x14 250 H Cor 220 Ingersoll Rand P. R.  Type 6 11 x15 300 40,000 Con 130 Nelseco Diesel 8 9 x12 3 350 28,375 H Cor 320 Dow 6 12 x18 240 34,400 H Cor 320 Dow 6 12 x18 250 H Cor 320 Dow 6 12 x18 240 56,940 H Cor 320 Nelseco Diesel 6 13 x18 240 56,940 H Cor 320 Nelseco Diesel 6 13 x18 240 56,940 H Cor 320 Nelseco Diesel 6 13 x18 240 56,940 H Cor 320 Nelseco Diesel 6 13 x18 240 56,940 H Cor 320 Nelseco Diesel 8 13 x18 240 76,000 H Cor 320 Nelseco Diesel 8 13 x18 240 76,0           | H Comp.  |          |         | 425 | 634×9   | 6     | Dodge            | 75    |
| 75   | H Comp.  | H        | 15,500  | 400 | 834x12  | 3     | Pittsburgh       | 75    |
| 100   Fulton   | H Comp.  | H        | 16,750  | 325 |         | 3     | Western          | 75    |
| 100   Fulton   6   8   x0   400   13,000   L   Con   | Comp.    |          | 90,000  | 350 | 9 x13   | 3     | Midwest Diesel   | 90    |
| 100   Pittsburgh   | L Comp.  |          | 13,000  | 400 | 8 x0    | 6     | Fulton           | 100   |
| 100   Western  | H Comp.  | H        | 18,000  | 400 | 816x12  | 4     | Pirtahurah       |       |
| 120   Midweat Diese    4 9 x13   350   25,000     Con  |          |          |         |     |         | 4     |                  |       |
| 120  | Comp.    |          |         | 350 |         | 4     | Midwest Diesel   |       |
| 150  | H Comp.  |          |         |     |         | 4     | Nelseco Diesel   |       |
| 150   Western   6 9\frac{9}{4}\text{x}\frac{1}{4}\$   325   27,000   H   Con     180   Midwest Diesel   6 9 x13   350   35,000   |          |          |         |     |         |       |                  |       |
| 180   Midwest Diesel   6 9 x13   350   35,000  | H Comp.  | H        |         |     | 01/214  | 6     |                  |       |
| 180 Nelseco Diesel   | Comp.    |          |         |     | 9 v13   |       | Midwest Diesel   |       |
| 200 Winton   6   11 x14   250     H   Cor  | H Comp.  |          |         |     |         |       |                  |       |
| Type   6   11   x15   300   40,000     Cor   |          |          |         |     |         |       |                  |       |
| Type 6 11 x15 300 40,000 Cor 13 x18 240 34,400 H Cor 320 Dow 6 12 x18 240 34,000 H Cor 320 Dow 6 12 x18 240 34,000 H Cor 320 Dow 6 12 x18 240 36,000 H Cor 320 McIntosh & Seymour 6 205 H Cor 320 McIntosh & Seymour 6 206 H Cor 320 McIntosh & Seymour 6 207 M Cor 320 McIntosh & Seymour 6 207 207 H Cor 320 McIntosh & Seymour 6 .   | n comp.  | **       |         | 200 | 11 714  |       |                  |       |
| 240   Nelseco Diesel   4   13 x18   240   34,400   H   Cor   | Comp.    |          | 40 000  | 300 | 11 -15  |       |                  | 220   |
| 240   Nelseco Diesel   8   9   x123\(\frac{1}{2}\)   350   28\(\frac{3}{2}\) 375   H   Cor   300   Ingersoll Rand P. R.   Type   6   13   x19   250   63\(\frac{3}{2}\) 000   Cor   300   Ow   6   12   x18   250     H   Cor   360   Nelseco Diesel   6   13   x18   240   56\(\frac{3}{2}\) 90   McIntosh & Seymour   6     265     H   Cor   390   Nelseco Diesel   8   12   x18   230     H   Cor   425   Dow   8   12   x18   240   76\(\frac{3}{2}\) 000   H   Cor   500   Dow   6   16   x26   175     H   Cor   425   Cor   430   Co | H Comp.  |          |         |     |         |       |                  | 240   |
| 300   Ingersoll Rand P. R.   Type   6   13   x19   250   63,000     Cor  |          |          |         |     |         |       |                  |       |
| Type 6 13 x19 250 63,000 Cor<br>300 Winton 6 12 15/16x18 210 H Cor<br>320 Dow 6 12 x18 250 H Cor<br>360 Nelseco Diesel 6 13 x18 240 56,940 H Cor<br>480 Nelseco Diesel 8 13 x18 250 H Cor<br>480 Nelseco Diesel 8 13 x18 240 76,000 H Cor<br>500 Dow 6 16 x26 175 H Cor  | as comp. |          | 20,010  | 000 | 0 A14/2 |       |                  |       |
| 300   Winton   6   12   15/16x18   210     H   Col   | Comp.    |          | 63 000  | 250 | 19 -10  |       |                  | 300   |
| 320   Dow   6   12   x18   250     H   Cor     360   Nelseco Diesel   6   13   x18   240   56,940   H   Cor     390   Melrosh & Seymour   6     265     H   Cor     425   Dow   8   12   x18   250     H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     500   Dow   6   16   x26   175     H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor     480   Nelseco Diesel   8   13   x18   240   76,000   H   Cor   | H Comp.  |          |         |     |         |       | Winter           | 200   |
| 360 Nelseco Diesel   6   13 x 18   240   56,940   H   Cor<br>  390 McIntosh & Seymour 6     265     H   Cor<br>  425 Dow   8   12 x 18   250     H   Cor<br>  480 Nelseco Diesel   8   13 x 18   240   76,000   H   Cor<br>  500 Dow   6   16 x 26   175     H   Cor   |          |          |         |     |         |       |                  |       |
| 390   McIntosh & Seymour 6     265     H   Cot   425   Dow   8   12   x18   250     H   Cot   480   Nelseco Diesel   8   13   x18   240   76,000   H   Cot   500   Dow   6   16   x26   175     H   Cot   Cot  |          |          | 50 040  |     |         |       |                  |       |
| 425 Dow 8 12 x18 250 H Cot<br>480 Nelseco Diesel 8 13 x18 240 76,000 H Cot<br>500 Dow 6 16 x26 175 H Cot   |          |          |         |     |         |       |                  |       |
| 480 Nelseco Diesel 8 13 x18 240 76,000 H Cor<br>500 Dow 6 16 x26 175 H Cor   | an comp. |          |         |     | 10 -10  |       |                  |       |
| 500 Dow 6 16 x26 175 H Con   |          |          | 76 000  |     |         |       |                  |       |
|  |          |          |         |     |         |       |                  |       |
|  | H Comp.  | 13       |         | 110 | 10 x20  |       |                  |       |
| 500 Ingersoll Rand P. R.   | C        |          | 144 000 | 107 | 17 -07  |       |                  | 500   |
| Type 6 17 x27 165 144,000 Coi  | Comp.    |          |         |     |         |       | Type             |       |
|  |          | **       |         |     |         |       | Skandia          |       |
|  |          |          |         |     |         |       |                  |       |
|  |          |          |         |     |         |       |                  |       |
| 850 Skandia 6 201/4x351/4 135 320,000 H Con  |          | 9.0      |         |     | 20%x35% |       |                  |       |
|  |          |          |         |     |         | ur 6  |                  |       |
|  |          |          |         |     |         | 6     |                  |       |
|  |          | 9.0      |         |     |         |       |                  |       |
|  |          |          |         |     |         | ur 6  |                  |       |
|  |          |          |         |     |         | 8     |                  |       |
|  |          |          |         |     |         |       |                  |       |
| 2,000 McIntosh & Seymour 6 105 H Co  | H Comp.  | H        |         | 105 |         | our 6 | McIntosh & Seymo | 2,000 |

#### Steam Plants

| Rated<br>H. P. | Manufacturer | No. of Cyls. | Stroke  | R.P.M. | Wt.    | Туре   |
|----------------|--------------|--------------|---------|--------|--------|--------|
| 25             | Talbot       | 2            | 5 x5    | 800    | 1,250  | Direct |
| 50             | Talbot       | 4            | 5 x5    | 800    | 1,950  | Direct |
| 100            | Talbot       | 4            | 6 x6    | 800    | 2,820  | Direct |
| 100            | Talbot       | 4            | 5 x5    | 800    | 2,500  | Direct |
| 200            | Talbot       | 4            | 8 x8    | 800    | 4,880  | Direct |
| 200            | Talbot       | 4 :          | 614x614 | 800    | 4,750  | Direct |
| 400            | Talbot       | 4            | 8 x8    | 800    | 9,300  | Direct |
| 600            | Talbot       | 4            | 936x936 | 800    | 13,500 | Direct |
| 1,000          | Talbot       | 4            | 11 ×11  | 800    | 24,000 | Direct |
| 2,000          | Talbot       | 4            | 15 x15  | 800    | 42,000 | Direct |

#### American Manufacturers of Four-Cycle Heavy Oil Motors

(Continued from page 45)

| McIntosh & Seymour McIntosh & Seymour Corp., Auburn, N. Y.   |
|--|
| 390, 640, 960, 1150, 1300, 1550, 2000 H. P. 6 cyls.<br>Nelseco                                     |
| 120, 180, 240, 360, 480 H. P. 4, 6, 8 cyls.<br>NordbergNordberg Manufacturing Co., Milwaukee, Wis. |
| 330 to 2800 H. P.  Pittsburgh Pittsburgh Filter & Eng. Co., 280 Broadway, New York,                |
| N. Y. 50, 75, 100, 150 H. P. 2-6 cyls.  Quayle   |
| Chicago, Ill. 30 H. P. 4 cyls.  Western Machinery Co., Los Angeles, Cal.                           |
| 25, 50, 75, 100, 150 H. P. 1-6 cyls.  Winton Engine Works, 2116 W. 106th St., Cleveland, O.        |
| 50, 75, 115, 150, 225, 300, 450 H. P. 3-8 cyls.  |

## SMALL MOTOR BOATS

## Their Care, Construction, and Equipment

#### A Monthly Prize Contest Conducted by Motor Boatmen

Questions Submitted for the February Prize Contest

1. What work do you expect to do on your motor boat while it is out of commission during the winter month

Suggested by H. A. H., Baltimore, Md.

2. Explain and illustrate the best and simplest way to ventilate the engine room so as to provide pure, cool air at all times.

Suggested by W. A. R., San Pedro, Cal.

Describe and illustrate the best form of towing bitts or sampson posts and the best method of construction and fastening to the hull.

Suggested by W. B. M., Newburgh, N. Y.

#### Rules for the Prize Contest

ANSWERS to the above questions for the February issue, addressed to the Editor of MoToR Boating, 119 West 40th St., New York, must be (a) in our hands on or before December 25, (b) about 500 words long, (c) written on one side of the paper only, (d) accompanied by the senders' names and addresses.

The name will be withheld and initials used.
QUESTIONS for the next contest must reach us on or before December 25. The Editor reserves the right to make such changes and corrections in the accepted answers as he may deem necessary.

The prizes are: For each of the best answers to the questions below, any article or articles sold by an advertiser advertising in the current issue of MoToR Boating of which the advertised price does not exceed \$25, or a credit of \$25 on any article which sells for more than

that amount. There are three prizes—one for each question—but a contestant need send in an answer to only one if he does not care to or answers which we print that do not win a prize we pay space

For answers which we print that the relationship of the questions selected for use in the following month's contest, any article or articles sold by an advertiser advertising in this issue of MoToR BoatinG of which the advertised price does not exceed \$5, or a credit of \$5 on any article which sells for more than that

amount.

All details connected with the ordering of the prizes selected by the winners must be handled by us. The winners should be particular to specify from which advertisers they desire to have their prizes ordered.

### Solving the Problem of Towing the Dink

Suggestions for Improving the Towing Qualities of the Flat-Bottom Boat and Keeping It Dry

Answers to the Following Question, Published in the October Issue

"Describe and give drawings of any practical device with which the towing qualities of a flat-bottom rowboat or dink may be improved."

#### An Auxiliary Skeg is Useful

(The Prize-Winning Answer)

BOUT the simplest method of improving the towing qualities of the flat-bottom tender, if this has not already been tried, is to attach the tow-line near the waterline instead of at the sheer. One way is to drill a hole through the stem near the waterline and then drive in and flare over at each end a soft copper tube; then run the line through this and splice it. Or a galvanized or bronze shoulder ring-bolt may be put through the stem and riveted over a clinch ring inside.

A flat-bottom boat is generally provided with but a rudi-mentary skeg, if any at all, this lack of a guiding plane be-low water causing it to yaw badly when towed, especially in a cross wind. A permanent deep skeg would be in the way when hauling the tender on board or when running up on the beach, but it would be possible to fit a hinged auxiliary skeg which would fold up against the bottom when the tender was not being towed. The sketch suggests such an arrangement, the folding skeg being pivoted on a pair of "hatch corner" hinges which may be obtained from a marine hardware house and which are well adapted for such a purpose, though strap hinges would also do. The

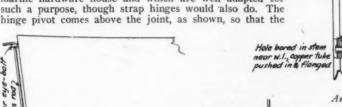
Bronze hatch corner hinges

Reinforcing strop

skeg will fold up clear of the regular narrow skeg. there would not be much strain on the folding piece when under way, it is held in place by a rod run through two ring bolts fastened to the stern of the boat. This rod is used to push down the skeg; then, when in place, it is put through the two rings and down past the extended end of the board to hold it in place. When removed, the hooked upper end of the rod is used to pull the skeg up against the bottom, the hinges working stiffly enough to hold it where

Another way to improve the towing qualities of the tender, especially on long cruises, is to fit a light canvas cover over it to keep out the water. A small open boat will soon become loggy from the amount of water that splashes into it, both from the waves and wind and the splashing of the exhaust and wake of the large boat and then it makes a heavy drag and is liable to become unmanageable. So a cover will provide good insurance against delay and annoyance when on the cruise.

H. H. P., Oakland, Cal.



Hinged auxiliary skeg



An auxiliary folding skeg attached as shown improves the towing of the dink wonderfully, says H. H. P.

#### Fasten the Tow-line Low Down

HE small boat, in order to tow well, should be short and light and designed so that it will plane easily at low speeds. In order to do this, the bow should have a very full deck line and con-siderable reserve buoyancy forward above the

waterline. This will cause the bow to rise quickly and the boat will practically plane over the water rather than plow through it. The forefoot should be cut away somewhat so as to allow the boat to swing around easily and follow the tow-line when starting and before the bow rises from the water. There should also be a small skeg or fin aft which will assist greatly in keeping the little fellow on her proper course.

Such a boat needs no special devices to improve its towing qualities other than fastening the tow-line low down on the stem so as to allow the bow to rise easily instead of pulling down on it as is done when the line is attached to

the stem at or near the sheer line.

Of course, there are a great variety of other small boats that were never intended or designed for towing that are frequently made to do duty as a dinghy or tender for some small motor boat; and I expect it was

had reference to when he asked the question. Some of these boats may be made to tow reasonably well by attaching the tow-line low down, just above waterline, as should be done on any small boat that is to be towed a good deal; and also, if necessary, by placing some weight or ballast as far aft as pos-sible. Should the boat be of flat-bottom construction and have no skeg aft, one may be applied easily and will be found to imthe towing prove qualities consider-

ably. The canoe is excellent example of boat that town lly. They are so that the bow badly. The long that does not rise easily at moderate speeds and usually there is no provision for making a line fast in the proper place for towing. Given the slightest chance and a reasonable length of line and your canoe will

simply go bottom up. Having had occasion to tow one of recently, them we found by experiment that when the line was fastened low on

the stem, a weight of twenty-five to forty pounds placed well aft, the canoe behaved very well at ordinary cruising speed. In towing our regular dinghy, about twenty feet of line has proven most satisfactory, while with the canoe it seemed unsafe to use more than six or eight feet.

In order to tow any small boat successfully the planing tendency must be encouraged in every way because the little fellow is really going pretty fast, considering the size, even at ordinary cruising speed. Any attempt at towing the small boat through the water rather than over it will result in forming powerful bow waves which in turn force the boat from her course and have a tendency as the pressure in-creases on one side of the bow to either roll the boat over or fill her.

There are a few boats that will behave better and pull easier if towed stern first. This may seem strange or even not look very shipshape but there is a reason for it; you simply must get that planing effect one way or the other. It's an experiment easily tried and well worth while if satisfactory results are not obtained in the usual way.

For those boats, or whatever they may happen to be called, that still persist in sheering off, racing up along-side, rooting, and acting up generally after the above suggestions have been tried out, rig up a stout pole aft or use the regular flagstaff with a brace on it. To this fasten a block two or three feet above the deck and bring the tow-line through this block. Elevating the line in this way will lift the bow from the water and prevent rooting. A little experimenting will soon show the proper length of line to use in order to raise the bow just enough to get best results.

C. H. C., Saginaw, Mich.

#### Squat Boards Make the Dink Plane

T is a well-known fact that the average broad-beam short-length flat-bottom dink is hard to tow and rides nose in the air, stern squatting and throwing an immense stern wake, which represents lost power and consequently

lost speed. The same principle which has been successfully used on fantails t e r n launches to prevent excessive squatting was applied to a hardtowing flatbottom dink with greatly improved results.

The dink in question. like its many brothers and sisters

would. when towed, ride with its bow in the air, receiving its support from the water at a point about amidships. Its underbody at the stern rose abruptly to the transom as is the usual practice in the building of these dinks, and this also created a suction which intensified the habit of squatting. This is shown in Figure I in the accompanying sketch.

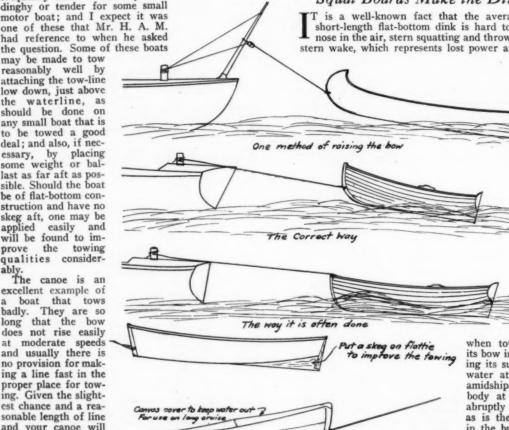
Squat boards were fitted of 3/8-inch white pine which continued the line of the bottom of the dink about 2 feet, 6 inches from the point

The boards were battened on the top so as to present an

where the bottom rose so abruptly.

unobstructed surface to the flow of water beneath; and braced with iron braces as shown in Figure II of the sketch. They were made with sides parallel, carrying the full width to the extreme after end, so as to get as much area as possible. The effect was that of increasing the length of the dink and the planing action of the broad surface effectually prevented undue squatting, preserving a normal trim when the dink was towed. Another thing which also was cor-rected was the point of fastening the painter to the dink. If the painter is attached at a low point on the stem of the dink the tendency to ride out at the bow will be accentu-This is also illustrated in Figure I.

W. E. M., Philadelphia, Pa.



Suggestions made by C. H. C. provide for different types of small boat

## To Save Your Boat, If Disabled in a Seaway

Numerous Ideas and Suggestions for Handling a Small Boat in a Heavy Sea When Disabled

Answers to the Following Question, Published in the October Issue:

"How would you rig a 'sea anchor' and what means would you employ to keep a boat disabled or unmanageable out of the trough of the sea and lessen her lee drift?"

#### The Sea Anchor - A Misnomer

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en ornk. he (The Prize-Winning Answer)

HE sea anchor in the ordinary sense is not an anchor at all, but rather a drag (or drogue) whose purpose is to hold the vessel's head toward the wind and lessen its drift. The word toward is used advisedly for, contrary to the ideas of the inexperienced, it does not hold the vessel's head directly into the wind, but at an angle to it, varying from 30 to 45 degrees—and this is particularly so in the case of power boats which we are discussing here. Before describing the make-up of the regular sea anchor and various substitutes let us study the actions of the wind and sea on power vessels and see the elements governing drift. Broadly speaking, these are two-draft and freeboard (the latter including here all upperworks, awnings, etc.). Now suppose we take two boxes, A and B, of exactly same length and breadth but with B deeper than A and ballasted so both show the same above water, but with twice the draft. Obviously, A will drift to leeward much faster than B, as they both have the same surface exposed to the wind (or effort) while B has the much greater lateral area of immersed surface (lateral resistance). Then take boxes C and D which have the same immersed surface (draft) but with D having twice the freeboard of C. Obviously, D will drift much faster than C.

So we see that the draft of a vessel and its freeboard in the broad sense are the governing factors of drift. When we come to combine irregular lateral immersed planes and irregular exposed surfaces, our problem begins to approach the conditions found in vessels. Take the irregular shaped box E F and the end F will drift to leeward faster than E as both ends have same surface exposed to the wind and F has half the draft of E. To go further and approach nearer to actual conditions of a power boat the box G H has the end G with greater draft (resistance) than at H but the

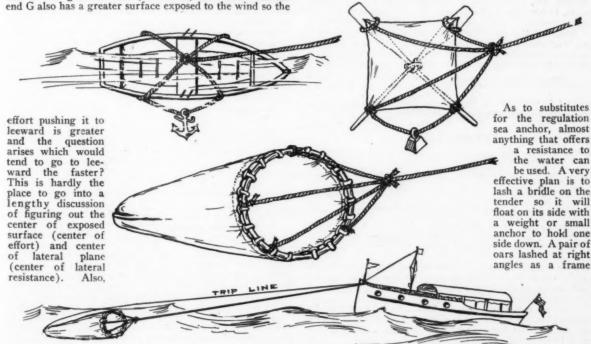
we have up to now ignored the action of the propeller, which has quite a large drag and consequently tends to retard the drift of the stern.

Now, if we resolve the box G H into a power boat we find quite a similarity in their profiles and as a matter of fact most power boats will lie in the trough of the sea if allowed to drift with engine stopped, as the greater draft forward with its greater topsides about balances the lesser draft aft (plus the propeller) and its lower topsides. As each and every boat differs materially in its height of topsides and lateral immersed area, no fixed rule can be made, but generally speaking the ordinary power boat will lie about broadside to the wind or nearly so.

Now, to make her lie head toward the wind is simple if an extra drag can be placed on the bow and so a sea anchor

is rigged to give this extra drag as follows:

A heavy iron hoop is fitted with a cone-shaped canvas bag and to this hoop is fitted a four-part bridle and this is shackled to the anchor cable and given plenty of scope. If you have ever towed a bucket you will see the action of the sea anchor immediately. It tends to retard the drift of the bow or, in other words, make the forward part go to leeward slower than the stern, which overcomes the tendency to lay broadside. All parts of the sea anchor must be extra heavy. For small boats a diameter of three to four feet for the hoop will be ample while for forty-footers a five-foot hoop is desirable, for fifty-footers a six-foot hoop and so on. No absolute rule can be made as it depends largely on the model of the vessel. The four-part bridle should be spliced over the hoop and the cone-shaped bag made of heavy canvas double sewed with grommets at the top for lashing to the hoop. In actual service a trip line is made fast to the apex of cone to be pulled and so spill the water in taking it in. The illustrations will explain fully the details as well as the method of its use.



Improvised types of sea anchors and the regulation style of canvas cone described by H. A. J.

for a spare piece of canvas and also weighted to hold it on end are the best methods or for a small boat a bunch of pails will help, but you don't usually carry a cargo of these articles. Any awning or sail that you can rig on the after end (and keep it there) will be a great help, and all power boats going to sea should carry a short and stout rig with mast stepped in the keel.

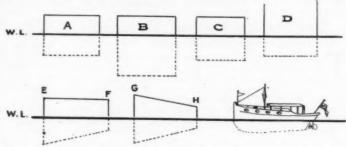
As a matter of fact, a power boat will lie easiest and nearer to the wind if the sea anchor is made fast to the stern, but this of course can't be done

as the seas coming aboard would soon break in the afterhouse and sink the vessel.

While various substitutes have been mentioned when you really need a sea anchor, the average power boat does not present a steady enough platform to rig them with much degree of success. But then the saving factor is that to use a sea anchor you must have lots of room under your lees because, contrary to the accepted belief, the drift is fairly fast and a boat on the high seas should be equipped with a reg-ular sea anchor which, let us hope, she won't need at all, but if she does, it will be the most valuable article ever carried. H. A. J., New York, N. Y.

not wait until your boat is in the breakers-let go your anchor at once, giving it all the cable you have. closely to see that you are not dragging your anchor, if you have one, and weight at least the larger anchor but preferably both.

This weight can be attached to the cable or may be let down the cable on a loop with a line attached, the other end of the line being made fast to the riding bit. The weight



Diagrams to illustrate the differences between the exposed surfaces and the immersed surfaces referred to by H. A. J.

#### Dinghy Can Be Used in the Emergency

ROBABLY the quickest and easiest way to rig a sea anchor for a 35- to 40-footer is to use the tender. Attach the painter line to the stern, making as large a loop as possible and make your cable fast to the center of the loop. Fasten a small anchor or other weight to one side of the tender so as to keep her tipped and filled with water. Care must be exercised when putting her overboard to protect it from being smashed against the boat, then give out plenty of cable. If you do not carry a tender lash together a pair of oars and the boat hook, or any other pieces of timber of suitable size and length, forming a triangle, and cover with canvas or blankets. Fasten a small anchor or other weight to one point of the triangle to keep it upright.

Attach a line to each corner, trimming them to the center, where you will fasten the cable.

Another plan is to use removable flooring and seats, nail or screw them together in the fashion of a door. Attach a weight and ring lines in the same order as the triangle sea anchor. Or, make a raft by lashing together floor, boards, seats, locker tops, cushions, etc., heavily weight it and put

out as a drag.

Assuming that the engine is out of commission and steerage way cannot be maintained and that your boat is riding to a sea anchor in water too deep for ground tackle, by all means rig a steering oar to the stern. If you do not have a means rig a steering oar to the stern.

spare oar aboard you can easily im-FIGURE I FASTEN PAINTER HIGH. TEON BRACES

Squat boards which will prevent the dink from riding too much on her stern are proposed by W. E. M.

FIGURE II

provise one, the longer the steering oar the better it is. A skilful use of the steering oar as an auxiliary to the rudder will enable you to keep your boat out of the trough and prevent capsizing.

With an emergency sail the drift can be overcome by tacking, but in the absence of a sail and where there is danger of the boat being dashed on the shore, other means must be employed.

When this possibility exists it is evident that the water is not too deep for the immediate use of ground tackle. Do should be a considerable distance from the anchor—say about one-quarter of the length of the cable let out. The weight greatly assists the anchor in holding as it sags the cable and gives a straight pull to the anchor

In case your ground tackle gives way and the engine is still out of commission, do not hesitate to order all on board to put on life preservers. By means of the steering oar head for the shore, remembering that as long as you keep your boat from capsizing you have a fighting chance for your life.

A. W. H., Sharon, Pa.

#### An Improvised Drag

HEN a boat is disabled by having a dead engine, broken propeller shaft or by having lost the propeller so that she can make no headway, something should be done to keep her head to the wind and sea until repairs can be made or until help can be had. The first thing to do is to rig something that will act as a drag and keep her head to the wind and prevent her from drifting to leeward while repairs are being made if there is no anchorage. Sometimes a sail may be rigged and the boat worked to an anchorage, but if the propeller is on she will make very little headway. Rigging a sail or repairing the motor may take some time and if in a heavy sea and in danger from a lee shore the first thing to think of is the sea anchor. If you haven't a regular one aboard you can easily make one out of a piece of canvas (the awning or any old thing)

about six feet wide and six or more feet long and a pair of oars. Lash the oars together and tie one end of the canvas securely to them, weight the other end of the canvas with some tools or any heavy iron or steel articles so that when the whole thing is in the water the weights will almost sink the oars.

Now tie a ten-foot line to each of the four corners of the canvas, tie the four lines together and to the long rope with

which it is to be let out about fifty or more feet to wind-You will find that this rig will keep her head up but she will ride much easier if she takes the seas quartering, so after letting out about forty feet tie another rope to the first and let them both out about twenty feet farther. This last is what is termed a spring and is fastened about amidships while the long line goes through the bow chocks. When you put this drag overboard be careful not to tangle things up and lessen its efficiency. The next time you go out have on board a regular sea anchor, which can be made cheaply in the following way: Take a large strong wooden

STERN BOARD

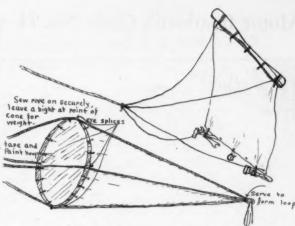
barrel hoop and wind it tightly with electric tape and service with marline. Paint or varnish it while you are cutting out a piece of canvas to make a cone six feet long with the large end the size of the hoop. Put in grommets about three inches apart around the large end of the canvas cone and tie securely to the hoop. Fasten fan ropes to the hoop equal distances apart and long enough to reach back to the point, when an eye is primed in which to fasten a weight of about four pounds. This is a very useful thing to have on board and takes very little space. You can buy them but they cost about twelve dollars and you can make one for almost nothing if you have a few odds and ends lying around.

Should there be a decided chop to the seas they can be

made easier on the small boat by the use of an oil slick. This is easily prepared by soaking a good big bundle of waste or old rags in oil, engine oil will have to serve in this emergency and poking it all into a bag made of canvas or any other material at hand. This is attached to the sea anchor and as the oil film spreads over the surface it will drive toward the boat and in some measure kill the surface chop. The large heavy roll of the seas cannot be relieved

by the use of oil or otherwise.

In the absence of the necessaries for improvising a sea anchor a substitute can still be devised. A dinghy, if cap-sized and lashed so that it will float on edge and two with the inside toward the boat will make a very effective drag.



A sea anchor as devised for emergency use by E. L. C.

Buckets con also be pressed into service and will offer a surprising resistance, several being better than one. E. L. C., Cambridge, Mass.

## How Much To Pay For an Old Motor

Depreciation and Repair Cost Charts From Which an Accurate Appraisal of an Old Motor Can Be Made

Answers to the Following Question, Published in the October Issue: "Give detailed information on the method of determining the value of a used motor including a depreciation chart and show the cost of putting in good mechanical condition."

#### Determining Value of a Used Motor

O itemize and summarize the past, present and future of a used motor is the somewhat clairvoyant task of one who would attempt to determine its value.

It is well, as a starting point, to consider what the motor was originally—its size, type and price, the reputation of the maker and dealers, its design and performance attainments, and the installation, use and care it received. Such qualifications can be determined only by one who has had enough experience as a producer, sales or service man, or consumer to distinguish the motors that were put out to satisfy from the ones that were put out to sell, and also to ascertain evidences of both use and abuse.

The present state of the motor is largely up to the judgment of a good mechanic who can determine, within reasonable limits, its condition, needs and future service. If it is a motor of, say, at least \$200 used cost, the purchaser is entitled to make sufficient investigation to insure reasonable proof of its "as is" condition. This may include the use of a compressometer on individual cylinders, removal and inspection of part of crankcase oil for traces of sediment and gasoline, inspection of ignition and carburetion units and connections, valve mechanism, oil and water pumps and connections, jackets, manifolding, crankcase, cylinder head, block, and base, front end, and clutch shaft or transmission flange and connections.

Generally it is advisable to grade a motor down if it shows any non-genuine or superfluous items, and also to consider detracting dirty, worn or damaged nuts, studs or covers which indicate neglect, tampering or careless or excessive repairs.

A demonstration under actual conditions in a boat carries the most weight, particularly in proving speed, balance, power and responsiveness. Many motor men locate objectionable noises and "feel" wear in pistons and rings, cylinders, cams, valves, rod and shaft bearings best by turning the motor over slowly by crank.

The present popularity and good-will associated with the motor in the open market constitute a barometer of its future security. Comparison of the service desired with the service rendered by identical motors in similar conditions

should be made. Inquiries among users or repair or service station men reveal, in a general way, probable maintenance and repair costs.

Summing up these considerations into more definite depreciation and repair cost charts, we may figure as follows:

|     | Depreciation                                |                  |
|-----|---|------------------|
|     | Poor former reputation of maker 109         | (- equals 5%)    |
| 2.  | Poor present reputation of maker            | · · · · · · · to |
| _   | and sales and service policies40% to 80%    |                  |
|     | Unpopular size                              |                  |
| 4.  | Unpopular type                              | 0 •              |
| 5.  |   |                  |
|     | Not adaptable to individual needs20% to 509 |                  |
| 7.  | Age and amount of use20% to 609             | 6 to             |
|     |   | *********        |
| 8.  | Bad looking (lack of proper care            | · · to           |
|     | manifested)                                 | 6                |
| 9.  | Not standard                                | 6 to             |
| 10. | Incomplete or unsatisfactory demon-         | to               |
|     | stration                                    | 6                |

Percentage deductions in this table, made from the origi nal cost of the motor, present a fair gauge of its probable value to the prospective buyer.

Restoration

Repairing: 1. Valves (grinding and adjusting), 2% to 10%. 2. Cylinders (including decarbonizing, regrinding, welding, new gaskets), 10% to 40%. 3. Bearings (including scraping and fitting) = 10% to 30%. 4. Gears (including pump, timing, inbuilt transmission; adjusting and grinding) = 5% to 30%. 5. Manifolds (gaskets, studs, connections, stuffing box; including welding, soldering, packing) = 2% to 15%. 6. Crankcase (alignment, cracks, sandholes) = 5% to 20%. 7. Shafts (crankshaft, cambaft, pump shaft, ignition or generator unit shaft, clutch shaft; welding, truing, shimming, adjusting) = 15% to 50%. 8. Ignition and carburetion and auxiliary units (including starter, generator, battery, coil, wiring; cleaning and adjusting) = 5% to 35%.

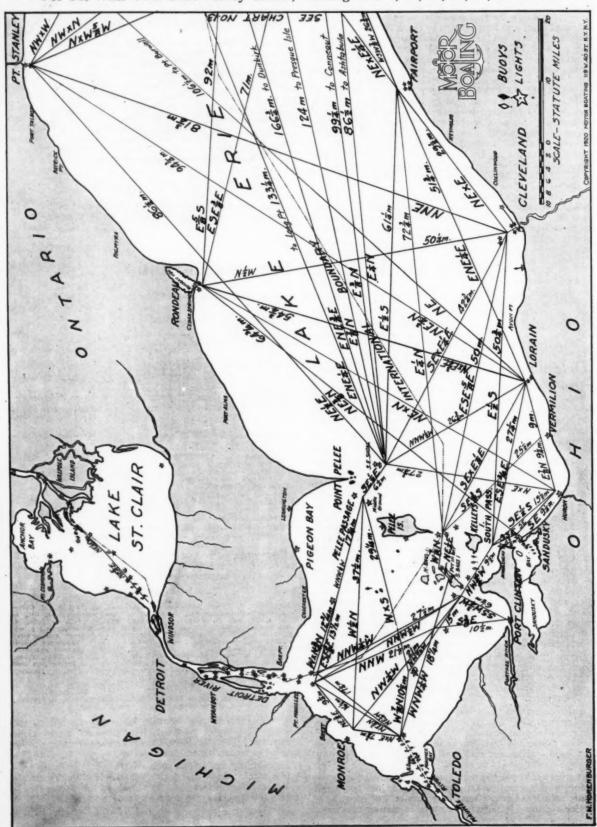
Replacing: 1. Valves = 5% to 20%. 2. Cylinders = 20% to 40%. 3. Bearings = 5% to 15%. 4. Gears = 2% to 25%. 5. Manifolds = 2% to 15%. 6. Crankcase = 15% to 40%. 7. Shafts = 10% to 50%. 8. Ignition, carburetion, and auxiliary units = 10% to 40%.

Percentage estimates in these tables are figured on the average or accepted price asked for the used motor. Generally, the higher the price, the lower the percentage to be applied in computing restoration costs.

Calculations made from such arbitrary standards necessitate a careful study of relative values and, though individual cases often warrant slight variation, the average estimates resulting may be taken as fairly accurate.

D. McC., Detroit, Mich.

Motor Boatmen's Chart No. 14—Lake Erie, Part 2, Western End For Use With U. S. Lake Survey Charts, Catalog Nos. 3, 34, 35, 36, 37, 41 and 42



## Builders of Stock Boats for 1921

An Alphabetical List of Manufacturers of Stock Boats Whose Products Are Listed Under Their Trade Name Below

Name of Boat
Albany. Albany Boat Corp., Waterviliet, N. Y.
Apel-Craft. Ventnor Boat Works, Ventnor, Atlantic City, N. J.
Barbour. Barbour Boat & Pattern Co., St. Louis, Mo.
Belle Isle. Belle Isle Boat & Eng. Co., Detroit, Mich.
Burger Burger Boat Company, Manitowoc, Wis.
Cuthbert. A. G. Cuthbert Co., Sandusky, O.
Darrow. Darrow Steel Boat Co., Albion, Mich.
Disappearing Propeller, Disappearing Propeller Boat Co., Ltd., Toronto, Can.
Elco. The Elco Wks, Bayonne, N. J.
Everett Hunter Everett Hunter Boat Co., McHenry, Ill.
Evinrude. Evinrude Motor Co., Milwauke, Wis.
Fay & Bowen Fay & Bowen Eng. Co., Geneva, N. Y.
Great Lakes Great Lakes Boat Blag. Corp., Milwauke, Wis.
Hacker. Hacker Boat Co., Inc., Detroit, Mich.
Harrison. R. W. Harrison Boat Works, Bay View Park, Toledo, O.
Hyde. Hyde Boat & Engine Co., 78 Fourth Ave., Brooklyn,
N. Y.
International. International Shipbidg. & Marine Eng. Corp., Nyack,
N. Y.

Name of Boat

Kretzer ...

Kretzer Yacht & Boat Works, 218th St. & Harlem
River, N. Y.

Luders...

Luders...

Mattituck...

Mattituck Boat Works, Mattituck, N. Y.

Moxley...

W. J. Moxley & Son, Cos Cob, Conn.

Mullins...

Mullins Body Corp., Salem, O.

Niagara...

Niagara...

Niagara...

Niagara...

Peterborough...

Peterborough...

Peterborough...

Racine...

Racine...

Racine...

Racine...

Ramaley...

Ramaley...

Ramaley...

Ramaley...

Ramaley...

Ramaley...

Reliance...

Rochester...

Richardson...

River, New York, N. Y.

Richardson...

Richardson.

## Stock Boats for 1921

An Index of All Stock Boats Regularly Carried By Various Builders Listed According to Their Size

| h    | Manu-<br>facturer      | Туре                     | Beam            | Draft<br>Ins. | Horse<br>Power | RPM   | Pro-<br>peir.<br>Ins. | Speed<br>m p b | Lgh<br>Ft. | Manu-<br>facturer         | Туре            | Beam   | Draft<br>Ins. | Horse<br>Power | RPM   | Pro-<br>peir.<br>Ins. | Spee<br>m p |
|------|------------------------|--------------------------|-----------------|---------------|----------------|-------|-----------------------|----------------|------------|---------------------------|-----------------|--------|---------------|----------------|-------|-----------------------|-------------|
|      | Hyde                   | Tender                   | 50"             | 8             | 2              | 750   | 12                    | 7              | 25         | Speedway                  | Runabout        | 5' 6"  | 22            | 28             |       |                       | 15          |
|      | Barbour                | Open                     | 44"             |               | 2              |       |                       | 8              | 25         | Speedway                  | Coupe Tender.   | 6' 3"  | 24            |                |       | ::*::                 | 15          |
|      | Evinrude               | Dinghy                   | 52"<br>36"      | 53/2          | 2              | 800   | 9x12                  | 7 7            | 26         | Albany                    | Runabout        | 6' 28" | 23            | 40             |       | 18x23                 | 20          |
| -    | Evinrude<br>Barbour    | SkiffOpen                | 48"             | 2             | 2 3            | 800   | 9x12                  | 8              | 26<br>26   | Cuthbert<br>Hacker        | Runabout        | 6' 2"  | 60<br>27      | 50             | 1,200 |                       | 25          |
|      | Darrow                 | Open                     | 3' 6"           | 11            | 2              | 600   | 9                     | 6              | 26         | Mullins                   | Runabout        | 6'     | 24            | 20-40          | 1,200 |                       | 14-2        |
|      | Racine                 | Launch                   |                 | 12            | 3-10           | 000   |                       | 8-14           | 26         | Reliance                  | Runabout        | 5' 2"  | 22            | 100            | 1,400 |                       | 36          |
|      | Barbour                | Open                     |                 |               | 4              |       |                       | 8              | 26         | Richardson                | Cruiser         | 8' 6"  | 30            | 12             | 500   |                       | 9           |
|      | Evinrude               | Tender                   | 46"             | 5             | 2              | 800   | 9x12                  | 7              | 26         | Richardson                | Runabout        | 6'     | 26            |                |       |                       |             |
| 1    | Evincude               | Tender                   | 46"             | 736           | 2              | 800   |                       |                | 26         | Seabright                 | Dory Cruiser    | 7' 6"  | 20            | 16             |       | 20x22                 | 9           |
|      | Hyde                   | Launch                   | 56"             | 16            | 214            | 750   | 12                    | 8              | 26         | Belle Isle                | Runabout        | 6' 6"  | 24            | 125            |       | 17×26                 |             |
|      | Moxley                 | Launch                   | 4'735"          | 18            | 23/2           | 700   |                       | 8              | 27         | Fay & Bowen               | Runabout        | 5' 3"  | 22            | 40             | 1,400 | 16×20                 |             |
|      | Mullins                | Launch                   | 4' 4"           | 12            | 8              |       |                       | 11             | 28         | Mattituck                 | Cruiser         | 5' 6"  | 30            | 20<br>35       | 700   |                       | 10          |
|      | Mullins                | Hydroplane<br>Tunnel     | 47 9/2          | 17            | 25<br>3-12     |       |                       | 28<br>614-814  | 28         | Niagara                   | Runabout        | 6'     | 18            | 60             | 1,000 | 18x20                 | 18<br>28    |
|      | Peterborough           | Tunnel                   | A' A'!          | 8             | 3              | 800   | 12                    | 8              | 28         | Ramaley<br>Speedway       | Coupe Tender.   |        | 27            | 00             |       |                       | 16          |
|      | Peterborough           | Launch                   | 4' 4"           | 16            | 6              | 900   | 14                    | 11             | 29'3       | Hacker                    | Runabout        | 6' 2"  | 27            | 175            | 1,600 |                       | 40          |
|      | Toppan                 | Hydroplane               | 436'            |               | 12             |       |                       | 15             | 30         | Albany                    | Runabout        | 6' 4"  | 26            | 100            |       | 19x32                 |             |
| 6    | Disappearing           | Propir. Launch           | 4' 11"          |               | 21/2           |       |                       | 9              | 30         | Apel-Craft                | Speed Run'b't.  | 7'     | 24            | 160            |       | 22x32                 |             |
| 311  | Disappearing           | Propir. Launch           | 4' 1"           |               | 3              |       |                       | 9              | 30         | Barbour                   | Cruiser         | 736'   | 26            | 15             | 1     |                       |             |
|      | Mullins                | Launch                   | 4' 2"           | 15            | 3-12           |       |                       | 7-10           | 30         | Elco                      | Express         | 6'     | 23            | 66             | 1,400 |                       | 21          |
|      | Barbour                | Open                     | 56"             |               | 4              |       |                       | 8              | 30         | Fay & Bowen               | Runabout        | 3' 6"  | 23<br>22      | 50             | 1,000 | 20x24                 | 20          |
|      | Mullins                | Launch                   | 4' 9"           | 15            | 8-12           |       |                       | 8-11           | 30         | Kretzer                   | Runabout        | 6'     | 22            | 35             | 1,200 | 20                    | 25          |
|      | Peterborough           | Launch                   | 4' 6"           | 18            | 3              | 800   | 12                    | 8              | 30         | Racine                    | Runabout        | 5' 8"  | 22            | 25-150         |       |                       | 20-3        |
|      | Racine                 | Shallow Draft.           |                 | 9             | 6-12           |       |                       | 7-11           | 30         | Racine                    | Standing Top    | 7'     | 24            | 20-45          | ***** | :::::                 | 10-1        |
|      | Speedway               | Tender                   | 5'              | 18            | 28             |       |                       | 15             | 30<br>30   | Ramaley                   | Runabout        | 6'     | 18 26         | 200<br>150     | 1,600 | 18x31                 | 3           |
|      | Toppan                 | Dory<br>Runabout         | *****           |               | 3              |       |                       | 7 7            | 30         | Reliance<br>Speedway      | Runabout        | 6'     | 26            | 44             | 1,400 |                       |             |
|      | Toppan<br>Disappearing | Propir. Launch           | 4' 9"           | *****         | 3              |       |                       | 9              | 30         | Speedway                  | Tender          | 6'     | 24            | 30             |       |                       | 14          |
|      | Speedway               | Tender                   | 5' 18"          | 28            | 9              |       |                       | 15             | 30         | Speedway                  | Coupe Tender.   |        | 27            | 30             |       |                       | 17          |
|      | Racine                 | Runabout                 |                 | 16            | 5-12           |       |                       | 8-14           | 30         | Toppan                    | Runabout        | 7'     |               | 25             |       |                       |             |
|      | Apel-Craft             | Runabout                 | 5'              | 18            | 24             | 1,400 | 16x20                 | 22             | 30         | Washington                | V Cruiser       | 8'     | 30            | 16             | 850   | 24x24                 | 11          |
| 11   | Barbour                | Open                     | 60"             |               | 6              |       |                       | 8              | 30         | Washington                | Round Cruiser   | 8' 7"  | 38            | 20             | 1,000 | 22x24                 | 13          |
|      |                        | Open                     | 4' 9"           | 16            | 10             | 1,000 | 13                    | 12             | 31         | Racine                    | V-Bot. Cruiser  | 7' 6"  | 26            | 20-60          |       |                       |             |
|      | Hyde                   | Launch                   | 65"             | 20            | 6              | 750   | 14                    | 9              | 32         | Albany                    | Runabout        | 6' 6"  | 27            | 200            |       | 19x34                 | 37          |
|      | Moxley                 | Launch                   | 5' 8"           | 22            | 5              | 700   | 14                    | 8              | 32         | Cuthbert                  | Cruiser         | 8' 6"  | 28            | 30             | 1,000 | 22                    | 12          |
|      | Mullins                | Runabout                 | 5'              | 20            | 8-12           |       |                       | 10-11          | 32         | Elco                      | Cruisette       | 8' 6"  | 33            | 40<br>20-75    | 900   |                       | 12          |
|      | Peterborough           | Runabout                 | 4' 10"<br>5' 6" | 20<br>20      | 28             | 1,000 |                       | 19<br>15       | 32         | Harrison<br>International | Cruiser         | 8 0    | 36            | 20-75          | 700   | 20x18                 | 12-2        |
|      | Speedway               |                          |                 | 20            | 12             |       |                       | 9              | 32         | Niagara                   | Runabout        | 6'     | 24            | 75             | 1,200 | 20x10                 | 28          |
|      | Toppan                 | Dory<br>Runabout         |                 | 20            | 12             |       |                       | 10             | 32         | Speedway                  | Runabout        | 6'     | 30            | 66             | 1,200 |                       | 22          |
| 13   | Mullins<br>Speedway    | Tender                   |                 | 20            | 28             |       |                       | 16             | 32         | Speedway                  | Coupe Tender.   | 7'     | 30            | 90             |       |                       | 20          |
|      | Toppan                 | V-Bottom                 | 5'              | 40            | 12             |       |                       | 10             | 35         | Barbour                   | Cruiser         | 8'     | 28            | 20             |       |                       | 20          |
|      | Racine                 | Shallow Draft.           | 5' 4"           | 10            | 6-12           |       |                       | 7-11           | 35         | Racine                    | Runabout        | 6'     | 15            | 75-200         |       |                       | 20-         |
| H    | Barbour                | Open                     |                 |               | 8              |       |                       | 8              | 35         | Ramaley                   | Runabout        | 7'     | 18            | 200            | 1,600 | 18x31                 | 40          |
| 11   | Everett Hunter         | Open                     | 5'              | 17            | 12             | 1,000 | 14                    | 14             | 35         | Ramaley                   | Runabout        |        | 18            | 400            | 1,600 | 24x36                 |             |
|      | Mullins                | Runabout                 | 5' 6"           | 22            | 12-20          |       |                       | 12-14          | 35         | Seabright                 | Dory Cruiser    | 10'    | 36            | 40             |       |                       | 10          |
| 1    | Ramaley                | Runabout                 | 6'              | 18            | 60             | 1,800 | 16x16                 | 31             | 35         | Speedway                  | Runabout        | 6' 6"  | 30            | 150            |       |                       | 27          |
|      | Richardson             | Runabout                 | 5' 6"           | 24            | 90             | 1,500 | 10.00                 | 35             | 35         | Speedway<br>Washington    | Coupe Tender.   | 01 311 | 30<br>48      | 14             | 480   | 00-00                 | 20          |
| 13   | Seabright              | Dory                     | 6'              | 20            | 11             | 800   | 18x20                 | 12-14          | 35<br>36   | Washington                | Cruiser         | 9, 9,  | 30            | 100            |       | 28x28<br>22x26        | 9           |
| ١,   | Toppan                 | V Runabout               | 5' 4"           | 24            | 12<br>20       | 1,000 | 18-94                 |                | 36         | Albany<br>Burger          | Cruiser         | 9'     | 36            | 35             |       | 22x24                 | 11          |
| 1    | Washington             | Coupe Tender.            |                 | 24            | 20             | 1,000 | 10122                 | 14             | 36         | Elco                      | Express         |        | 29            | 225            | 1,500 | 44143                 | 32          |
| 1    | Speedway<br>Racine     | Runabout                 | 4' 10"          | 14            | 15-50          |       |                       | 12-28          | 39'6       | Racine                    | Cruiser         |        | 30            | 40             | 2,000 |                       | 12          |
| 1    | Darrow                 | Open                     |                 | 24            | 20             | 1,500 | 16                    | 18             | 40         | Barbour                   | Cruiser         |        | 30            | 25             |       |                       |             |
| 1    | Fay & Bowen            | Runabout                 |                 | 17            | 22             | 1,080 |                       |                | 40         | Cuthbert                  | Day Cruiser     | 7' 6"  | 30            | 60             | 1,200 | 24                    | 17          |
|      | Apel-Craft             | Runabout                 | 6'              | 18            | 24             | 1,200 | 16x16                 | 15             | 40         | Elco                      | Cruisette       | 9' 6"  | 36            | 40             | 900   |                       | 10          |
|      |                        | Open                     | 8'              |               | 10             |       |                       | 8              | 40         | Rochester                 | V Cruiser       | 9' 6"  | 33            | 100            |       |                       | 15          |
|      | Dankaus I              | Canisas                  | 81              | 22            | 10             |       |                       |                | 40         | Washington                | V Cruiser       | 9' 11" | 28            | 100            | 1,275 | 21x22                 | 22          |
| 11   | Fuerage Hunter         | Onen                     | 5' 6"           | 17            | 19             | 1,000 | 16                    | 16             | 40         | Speedway                  | Day Cruiser     | 8' 9"  | 33            | 150            |       |                       | 19          |
| - 10 | Hyde                   | Launch<br>Runabout       | 75"             | 24            | 8              | 750   | 16                    | 9              | 4235       | Albany                    | Cruiser         | 10' 6" | 30            | 140            |       | 22x30                 | 19          |
|      | Kretzer                | Runabout                 | 5' 6"           | 22            | 25             | 1,000 | 18                    | 18             | 45         | Rochester                 | Cruiser         | 9'.6"  | 33            | 150            | 400   | 94                    | 18          |
|      |                        |                          |                 | 24            | 10             | 650   | 20                    | 10             | 45<br>50   | Washington                | Fish            | 11' 6" | 4-6           | 24<br>280      | 400   | 34                    | 9 22        |
| 1    | Mullins                | Runabout                 | 5' 2"           | 27            | 20-40<br>17-85 | ****  | *****                 | 14-20<br>20-33 | 50         | Albany                    | Cruiser         | 10' 4" | 40            | 75             | 625   |                       | 13          |
| 1    | Racine                 | Runabout                 |                 | 15<br>22      | 17-85          |       |                       | 10-18          | 52         | Elco                      | Cruiser         | 11' 4" | 36            | 75             | 020   |                       | 14          |
|      | Racine<br>Ramaley      | Standing Top<br>Runabout | 5 6'            | 18            | 60             | 1.800 | 16-16                 |                | 54         | Speedway<br>Great Lakes   | Express Cruiser | 117    | 42            | 300            | 1,400 | 22×24                 | 25          |
|      |                        |                          |                 |               |                |       |                       |                |            |                           |                 |        |               |                |       |                       |             |

## Yard and Shop

Notes of Interest to Both Owner and Manufacturer

#### Billy Gibb a Benedict

Announcement has been made of the marriage, on November 10th, of Miss La Verne Louise Varson and Billy Gibb, the genial Vice-President of the Frisbie Motor Company. The occasion was properly celebrated on the evening before the wedding at a dinner in Middletown, Conn., which all participants will long remember as a worth-while event. as a worth-while event.

#### Trials For the Roach Trophy

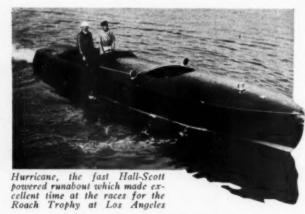
Speed trials were held last month off Los Angeles for the famous Roach Trophy. The Los Angeles Athletic Club conducted the event and a well-organized committee was in charge. The Trophy was won by Mystery V, owned, designed, built and raced by Frank A. Garbutt. This boat is equipped with twin Liberty motors and covered the mile in one minute nine sec-onds, or at the rate of 52.18 m.p.h. Hur-ricane, equipped with a Hall-Scott motor, negotiated the mile in one minute 24 4/5 seconds, at the rate of 42.5 m.p.h.

The Roach Trophy was donated for the

fastest mile on a straight-away course.



The window display of the Robert Simpson Company, Ltd., Toronto, Canada, featuring the October issue of MoToR BoatinG which had the story of the popular motor boat races at Toronto. The display was arranged by C. R. Allison, Secretary to the Toronto Motor Boat Club, E. P. Burns and S. Johns, Managers for the Robert Simpson Company and was most attractive



## Caille Perfection Motors In-crease Their Force

L. W. Brummet, formerly with the General Motors Corporation, has been appointed Assistant General Motors Corporation, has been appointed Assistant General Manager of the Caille Perfection Company in Detroit. His attention will be devoted principally to the factory with a view to increase the production and improve the product. The Caille Aristocrat is the four-cycle model produced by this company.

#### Marine Engine Exports from Detroit

All Detroit is very much interested in the proposed Great Lakes-to-the-Sea waterway which would make all important lake ports into ocean ports. The difficulty in getting through to present ocean ports and further difficulty of keeping forwarding expenses at a minimum has made the project a most important one for the middle West and Western shippers.

One fact brought out at the recent hearing in Detroit, which was unexpected, was that the export of marine engines stands third highest among Detroit exports. The greater exports than marine engines being automobiles and stoves. Four thousand dead weight tons of marine motors are exported annually. In value of products, marine engine exports are sixth, In value of products, marine engine exports are sixth,

being preceded by automobiles, drugs, stoves, adding machines and paint. Value of marine motors exported is \$832,000.00 annually.

As this city has long lead the world in manufacture of stoves, automobiles, paints, drugs and adding machines, it can be seen that in spite of the little fame given the marine engine industry in Detroit, it is one of the largest and most active in the country.

Four hundred and twenty articles are exported from Detroit in large quantities, which is further evidence of the magnitude of the marine engine business, in view of the fact that its export tonnage is third on this long list. With all due modesty, we state that the Caille Perfection Motor Company is the largest marine engine plant in Michigan and one of the largest in the country.

#### Sea Sled Company Acquires New Plant

The Wood & McClure Plant, at Mystic, Conn., has been acquired by the Sea Sled Company of Boston, Mass., and the greater part of their boat building activities will be transferred to the new plant. While they will continue to (Continued on page 67)



The exhibit of G. B. Carpenter and Company at the recent Marine Exposition held in Chicago. The leading marine and shipping men in the Great Lakes district attended, as well as numerous yacht owners

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# Here's a Famous Dutch Yacht, the Trintel—Valsparred, of Course!

Famous in Dutch yachting circles, the *Trintel* in 1919 won nearly all the first prizes offered in the 45 meter class. And she's Valsparred, of course!

This yacht was built in 1918-19 by the Haarlem Yachtwarf Co., Ltd. (N. V. Haarlemsche Jachtwerf); Director, J. H. Voogdt. Heer Voogdt is known as one of Holland's best yacht builders. Heer A. E. de Bruijn, of the same company, writes:

"We always use Valspar on the race-yachts and motorboats we build and have had only the best experiences with this varnish. Valspar absolutely won't turn white, which is not the case with even the best of other kinds of varnish. We are convinced that there exists no better varnish than Valspar."

Waterproof, durable, and quick drying, Valspar, the varnish that won't turn white, has long ago won international recognition as the perfect marine varnish.

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We have a complete list of all steam and power yachts, auxiliaries and houseboats available FOR SALE and CHARTER. A few are shown on this page. Flans, photographs and full particulars furnished on request.



No. 7—For Sale—200 ft. seagoing steel steam yacht. Lloyds highest rating. Cox & Stevens, 15 William Street, New York.



No. 3047—For Sale—Particularly attractive 165 ft. fast oilburning twin-screw, steel steam yacht. Speed up to 19 miles. Beautifully finished and furnished. Large accommodation includes dining saloon and music room on deck, six staterooms and three bathrooms below aft. Cox & Stevens, 15 William Street, New York.



No. 1662—For Sale—Attractive 90 ft. twin-screw gasoline houseboat. Speed 10-12 miles Large saloon, four staterooms, two bathrooms. All conveniences. Handsomely furnished. Cox & Stevens, 15 William Street, New York.



No. 1466—For Sale or Charter—Particularly desirable 140 ft. twin-screw steel cruising power yacht. Speed up to 18 miles; two 300 H.P. Standard motors. Dining saloon and social hall on deck; 3 double and 1 single staterooms, 3 bath and toilet rooms, etc. Recently overhauled thoroughly at large expense. In splendid condition. Cox & Stevens, 15 William Street, New York.



No. 3489—For Sale—Exceptionally highgrade twin-screw cruising power yacht; 90 x 16.3 x 5.2 ft. draught. Built 1917. Speed up to 16 miles; two 115 H.P. Winton motors. Large dining room in deckhouse forward; two double and one single staterooms; bathroom and 2 toilets, roomy pantry, galley, etc. Large deck space. Frice attractive. Cox & Stevens, 15 William Street, New York.



No. 979—Bargain—Especially desirable 98 ft, twin-screw cruising power yacht. Speed up to 16 miles; Standard motora. Deck dining saloon, three double and one single staterooms, two bathrooms, etc. Teakwood deckhouse and deck trim. Completely overhauled, new furnishings throughout. Cox & Stevens, 15 William Street, New York.



No. 2978— For Sale—Desirable twinscrew cruising power yacht; 80 x 14 x 4 ft. Speed 13 miles; two 50-60 H.P. Twentieth Century motors new 1919. Dining saloon, two double staterooms, bathroom and two toilets, galley, etc. Recently thoroughly overhauled at large expense. Cox & Stevens, 15 William Street, New York.



No. 3151—For Sale or Charter—Particularly desirable twin-screw houseboat, 77 x 17.6 x 3 ft. Speed 11 miles; two 6 cyl. 60-70 H.P. Standard motors new 1919. Large deckhouse containing social hall; main saloon, two double and two single staterooms, two bath and toilet rooms, etc. Handsomely finished and furnished. Cox & Stevens, 15 William Street, New York.



No. 3533—For Sale—Fast 72 ft. twinscrew cruising power yacht. Speed up to 17 miles; two 6 cyl. 125-150 H.P. Winton motors. Dining saloon, two double staterooms, bath and two toilets, galley, etc. Cox & Stevens, 15 William Street, New York.



No. 2730—For Sale—Roomy power househoat; 60 x 17 x 3 ft. Speed 8½ miles; 45 H.P. Sterling motor. Large saloon, one double and two single staterooms, two toilets, etc. Price reasonable. Located Florida. Cox & Stevens, 15 William Street, New York.



No. 2646—For Sale—Practically new 52 ft. Mathis houseboat. Standard motor. Deckhouse containing dining saloon and social hall; one double one single staterooms, toilet and shower bath. Located Florida. Price attractive. Cox & Stevens, 15 William Street, New York.



No. 2564—For Sale—50 foot Elco bridge deck cruiser. Built 1917. Speed 12 miles 6 cyl. 60/85 H.P. Sterling motor. Double stateroom, saloon with upper and lower berths, toilet room, galley, etc. Price attractive. Cox & Stevens, 15 William Street, New York.



No. 3255—For Sale—Roomy bridge deck cruiser; 60 x 13.6 x 3.6 ft. Built 1916. Speed up to 11 miles. 40/50 H.P. "20th Century" motor. Completely overhauled 1920. Large saloon, two double staterooms, toilet room, etc. Excellent condition. Cox & Stevens, 15 William Street, New York.

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We have a most complete and up-to-date list of steam and motor yachts of all sizes, sall, auxiliary, and houseboats on file in my office, kept constantly up-to-date by a thorough and comprehensive canvass of the entire yachting field from time to time. We are in a position to submit full information on any type of beat upon request.



No. 9597—For Sale—Possibly Consider Winter Charter—Handsome 162 ft. seagoing steam yacht, second to none of her size. Finest condition and perfectly appointed. Cruising speed 12 knots. Steel construction, thoroughly overhauled and refitted throughout, 1919. Mahogany and teak trim. Deck dining saloon and music room. Large bridge deck. Two double and four single staterooms, 2 baths. Ice plant, steam heat. Large water supply and liberal cruising radius. Price reasonable for yacht of size and type. Henry J. Giclow, Inc., 25 W. 43rd St., New York City.



No. 8080—For Sale—Charter—New modern 85 ft. twin-screw cruising houseboat. Deck dining saloon and galley. 2 double, 3 single staterooms. Hot water heat. 3 baths. Shoal draught makes attractive type Florida cruising. Two 50 horsepower motors give speed 10 miles. Good sea boat. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.



No. 7297—For Sale—Attractive high grade 48 ft. twin-screw express cruiser. New Van Blerck motors and upholstery 1920. Speed 21-24 miles. Excellent sea boat though shoal draught, and desirable for Southern and Northern use. Two cabins and separate galley. Crew forward. Bridge deck enclosed in removable glass partition. Cockpit aft. Modern in all appointments. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.



No. 7077—For Sale—Particularly desirable 80-foot twin-screw power yacht. "20th Century" 50/60 H.P. motors, new 1919. Deck dining room, two double staterooms, bathroom. All urnishings and equipment new 1919. Excellent condition. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.



No. 8102—Sale—Charter—New 98 ft. cruising houseboat located Southern waters. Modern in design and appointments. 100 horse-power motor gives speed 10 miles. Hot water heat. Deck dining saloon and living room, also owner's state room. Below are 2 double and 4 single staterooms. Most desirable type of Florida cruiser. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.



No. 7089—For Sale—Price Low—Modern 78 ft. twin-screw motor yacht in finest condition. Entirely overhauled 1920. All new furnishings supplied. Accommodations are deck dining saloon, three staterooms, saloon and bath. Large galley. Standard motors. Speed 12 miles. Good sea boat. Owner purchased larger yacht reason for selling. Seen New York. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.



No. 7040—For Sale—Bargain—Modern Lawley built 96 ft. twin-screw motor yacht, 15 ft. beam; Standard motora, speed 11 miles. Deck dining saloon, 2 double staterooms, accommodate seven. Economical, can run with 4 crew. Able sea boat. Furnishings new 1919, includes player piano. Large bridge and good deck space. Fine condition. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.



No. 8011—For Southern Charter—Most commodious 51-foot cruising houseboat available. Standard motor. Large deck space. Two double and two single staterooms. All good condition. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.

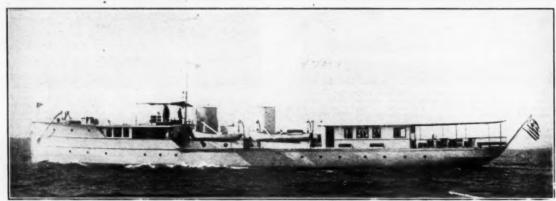
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No. 7474—Sale—Brand new fast cruiser; 2-6 cylinder Sterling motors; speed 21½ miles; all modern conveniences.



No. 9078—Sale or Charter—Fast 48 ft. express cruiser in commission. Immediate delivery—2 new 6 cylinder Van Blerck motors. Good accommodations. Thoroughly overhauled this year in all departments.



No. 8102—Sale—Charter; most desirable raised deck cruiser available; practically new, 81 ft. x 13 ft. x 5 ft. draft. Speed 15 miles, electric light, hot water, heat and refrigerating plant.



No. 1902—Sale or Charter—In Florida. Most commodious houseboat of her length available; 64 ft. x 17 ft. 6 in. x 3 ft. 2 in. draft.



No. 8949—For Sale—38 x 35 x 8 x 3, life boat type, with small cabin forward. Large cockpit. Powered with 6 cylinder Sterling. Inspectable near New York. Price reasonable.



No. 1927—Sale—Charter—Very desirable, twin screw houseboat; 5 staterooms, 3 bathrooms, dining saloon, lighted by electricity and hot water heat.

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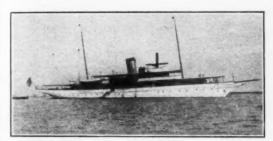
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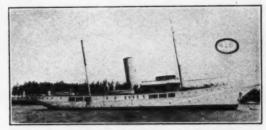
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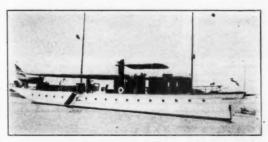
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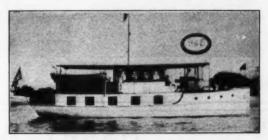
No. 111—For Sale—188 ft. steel steam yacht. Wonderfully well appointed. Excellent. condition. Commodious accommodations. Modern in every particular.



No. 415—For Sale or Charter—Thoroughly modern twin-screw steel steam yacht. 210 ft. x 32 ft. x 13 ft. draft. Récently built in Scotland to Lloyd's highest class. Excellent seaboat. Equipped for extensive cruising. Cold storage, wireless, etc. Cruising speed 11 to 12 knots.



No. 36. For Sale—Twin screw power yacht. 98 ft. x 16 ft. in x 4 ft. draft. Five staterooms, two baths. Deck dining saloon. Winton motors. In excellent condition.



No. 945—For Sale—Mathis 52 ft. houseboat. Launched in December, 1919. Is practically a new boat. Furnishings, etc., are of the best.



No. 573—For Sale or Charter—91 ft. x 14 ft. x 4 ft. 3 in. Twin-screw gas yacht. Winton motors. Speed up to 17 miles. Roomy accommodations with every convenience. In excellent condition, fully equipped,



No. 880—For Sale—56 ft. x 11 ft. 6 in. x 3 ft. twin-screw express cruiser. Completed 1917. Van Blerck motors. Guaranteed speed 25 miles. Attractively arranged and furnished.



No. 83—For Sale—85 ft. twin-screw cruising yacht. 16 ft. 7 in. beam, 3 ft. 6 in. draft. Excellent for southern cruising. Three double, one single staterooms, bath, also dining saloon on deck. Cruising speed 14 miles. Is in excellent condition and fully equipped with every modern convenience.



No. 986—For Sale or Charter—1919 twinscrew cruiser. Houseboat type. 62 ft. x 15 ft. 4 in. x 2 ft. 6 in. Sterling motors. Speed 12 miles. Attractively arranged and furnished. Excellent for Southern or River use.



No. 451. For Sale—85 ft. x 15 ft. 6 in. x 4 ft. power yacht. Attractively furnished throughout. Equipped for extensive cruising. Two double and one single staterooms. Located Great Lakes. In very good condition.



No. 971—For Sale—35 ft, Speedway runabout. In excellent condition. 150 H.P. Speedway motor, electric starter. Speed 27 miles. Mahogany planking and finish. Batten seam construction. Fully equipped with top, windshield, etc. A rare bargain.

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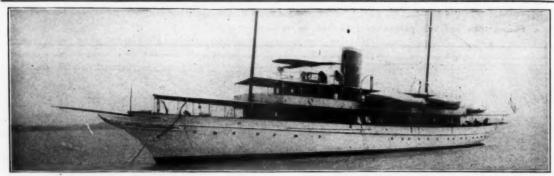
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No. 2283—Raised deck cruiser, with good sized deck house, 60 x 13.6, six cylinder Standard, first class condition. Located Florida.



No. 40—H—Twin screw houseboat, 77 x 18.6 x 3. Two Twentieth Century motors. Ideal boat for Southern use. Location Florida.



No. 2044—Bridge deck cruiser, 63 x 13.6 x 4 Twentieth Century motor, 4 cylinder. Speed 11/12 miles. Attractive interior arrangement

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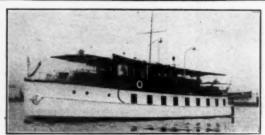
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No. 1032. For Sale.—Express cruiser 43 ft in length. Speed 25 miles. Excellent construction and seaworthy. Best of condition.



No. 1149—For Sale—Desirable 65 ft. twin-screw houseboat Accommodation for 7 besides crew. Bathroom, etc. Excellent condition.



No. 267—For Sale—51 ft. bridge deck cruiser. Accommodations for 8 persons. Standard motor. Speed 10-11 miles. Price attractive.

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No. 4322—Sale or Charter—Twin-screw 85 foot power housebost. Five staterooms, dining saloon, three baths, etc. Speed 10



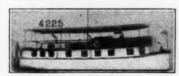
No. 1334—60 foot cruiser. Double state-room. Two transom berths in forward cabin and two in after cabin. Sleeps 6 to 8 people. Two berths for crew. New 35-85 H.P. Sterling motor installed this year. Self starter. Speed 12 miles. Electric



No. 2144-60-ft, yacht. Draft 2 ft. 8 in. Two double staterooms, main maloon, large deck maloon, bath, etc. 60 H.P. Sterling motor. Speed, 10-12 miles.



No. 2131—Brand new V-bottom express cruiser, (similar to cut). 45 x 10.6 x 3. Double stateroom, main cabin with two upper and two lower berths. Two toilet rooms, 6 cylinder 13-145 H.P. Sterling motor. Speed 20 miles.



No. 4225—Sale or Charter—51 foot power houseboat. Three staterooms and main sa-loon sleeps seven people. 32-37 H.P. Standard motor. Speed 8 miles.



No. 2136—Sale or Charter—Twin screw 80 foot power yacht. Two double state-rooms, dining saloon, etc. Two 220 H.P. Standard-motor. Speed up to 21 miles.





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that has no trouble to hold its speed any length of time. A new boat built by Lawley and is now ready to go overboard in perfect order, painted and varnished, etc., has been tuned up for speed in past few weeks. Now at Lawley's with dust cover over same. Cruiser is fully equipped and has a special GR 6-cyl. Sterling engine, two carburetors, etc. Delco lighting and cooking plant, special large batteries, gasoline electric air compression and large switchboard for all controls. Length 42 ft. 3 in., beam 9 ft., draught 2 ft. 10 in. For information address Edward Carlton Hammond, 79 Milk St., (Room 905), Boston, Mass.



For Sale—40 ft. x 9 ft. x 3 ft. hunting cabin cruiser, 40 H.P. 4 cyl. 63/2 x 7 heavy duty engine. Speed 10 miles. Electric lights, accommodations for four. Everything in absolutely first class condition and in daily use by a speed at Tampa, Florida. Price \$3,500.00. Address C. W. Greene Co., Tampa, Fla.



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FOR SALE—35 x 6 ft. 6 in. Hacker Runabout "SNAPSHOT", GR-6 Sterling Engine, guaranteed speed 35 m.p.h. Solid mahogany and salt water fittings throughout and completely equipped. In perfect order and completely refinished. Only four months old. Only reason for selling want faster boat. Act quickly before Detroit River freezes. John W. Stroh, 253 East Elizabeth Street, Detroit, Michigan.

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For Sale—Sterling 8 cylinder motor, 150-180 H.P., Model R, electric starter and lights; Battery almost new; Bosch magneto; propeller 20 x 34, Columbian; overhead valve. Excellent motor for cruiser or speed boat. Must sell at once. Have purchased cruiser. Would consider trade for a 25 or 30 foot V bottom runsbout for use on Lake George. Asking \$1,500.00; make offer. J. A. Mellish, St. Hubert Hotel, 120 West 57th St., New York.

For Sale—40 ft. 5 in. x 6 ft. 9 in. mahogany runabout "Chinook" speed 25 M.P.H. Equipped with six cylinder 5½ x 6 Van Blerck engine, electric starter, generator, electric lights, windshield, upholstered seats, top and curtains. Boat is in excellent condition and immediate shipment can be made to any point desired. Value \$7,500.00; will sell for \$5,000.00. Address Winton Engine Works, Cleveland, Ohio.

5 Horse Power Motor—We have on hand here at the factory one of our 5 Horse Power Motors, No. A 1788 received back from one of our distributors. This motor is absolutely new, but is of the type preceding our latest model. We will sell this motor with the same quarantee that goes on any of our motors, for \$175, with the following equipment. Engine complete, with spark plug, water pump, carburetor, and coupling, but without reverse gear. The Frisbie Motor Company, Middletown, Conn.

For Sale—36 x 9 x 3 cabin cruiser complete, 4 berths, double compartment, 6 ft. head room, plush mattreases, cabin finished in white enamel. Just the boat for cruising and comfort. Reason-able price. I would like a larger boat. E. Copleston, 562 Broad St., Newark, N. J.

TRIMOUNT
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OUTFITS
Blower runs by friction
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TRIMOUNT ROTARY POWER CO. 20 Heath Street Boston, Mass. (Factory: 292 Whiting Ave., E. Dedham, Mass.) Kermath Mfg. Co., Detroit, Mich.

Wanted—First class boat builders. Give experience and wages expected, in first letter. Albany Boat Corporation. Watervliet, N. Y.

For sale—1 pair Bausch & Lomb prism binoculars, 6 by 30 power. Just the thing to complete your motor boat equipment. Buy now for next season. Percy M. Child, 1110 14th St. N. W., Washington, D. C.

For Sale—1 2 KW. direct connected Carlisle & Finch electric outfit, with are search lamp. Percy M. Child, 1110 14th St. N.W., Washington, D. C.

For Sale—Several mushroom anchors, red leaded, weight 156 lbs. Net. \$12.50 each f.o.b. Washington, D. C., Percy M. Child, 1110 14th St., N.W.

Washington, D. C., Percy M. Child, 1110 14th St., N.W.

For Sale—New twin-screw cruiser, forty-four by ten feet. Speed, ten miles. Large covered bridge-deck. Two roomy cabins, aleeps six persons. All conveniences. Equipped with photo dark-room. Will sell hull separately. Reason for selling, sickness of owner. Stokes, 128 Annette Street. Toronto, Canada.

Before buying your motor get our latest motor and accessory list. We can save you money on guaranteed rebuilt motors. Jesiek Boat Company, Grand Rapids, Michigan.

CANADIANS, Second-hand engine bargains. Se

For Salc—One 2½ in. Model "L" Shebler carburetor in good working order, \$35.00. One 20 in. x 30 in. R. H. Columbian Rocket Type propeller bored for 1½ in. tapered shaft. Just like new. Used only ten minutes. \$20.00. One 21 in. x 30 in. R. H. Columbian Ailsa-Craig propeller bored for 1½ in. tapered shaft, brand new, bas never been used, \$35.00. John W. Stroh, 253 East Elizabeth Street, Detroit, Mich.

HAMILTON MARINE ENGINE EXCH., In., 440-444 52nd Street, Brooklyn, N. Y. Rebuilt Engines in stock for Immediate Delivery to Power Your Motor Ship Yacht or Tender, Write or wire us to hold the Engine you select. Our price is right in comparison to rebuilt

| Engines.   |  |   |          | *  |
|--|--|---|----------|--|
| rangement.   | H.F  | Inches  | Cyl.     | Price  |
| Standard   | 300  | 10 x103   | 6 6 1    | 4,000.00   |
| Standard   | 100  | 8 x10   | 6        | 2,800.00   |
| Standard   | 75   |   | 4        | 2,200.00   |
| Standard   | 75<br>37<br>300  | 6 x 8   | 4        | 1,160.00   |
| Standard   |  | 11 x15  | 6        | 2,600.00   |
| Graig  | 300<br>125<br>120<br>21<br>60-75   | 11 x15  | 0        |  |
| Pair   |  |   |          | 5,000.00   |
| Graig  | 125  | 11 x15  | 4        | 2,000.00   |
| Graig  | 120  | 636x 7  | 6        | 1,600.00   |
| Graig  | 21   | 534× 6  | 3        | 360.00   |
| Speedway   | 60-75  | 6 x 6   | 6        | 1,160.00   |
| Globe  | 24<br>37<br>18-21<br>24  | 7 x 9   | 2        | 400.00   |
| Automatic  | 37   | 36 756x 9<br>556x 7   | 3        | 1,000.00   |
| Automatic  | 18-21  | 51/4× 7   | 3        | 660.00   |
| Eagle  | 24   | 6 x 7   | 3        | 460.00   |
| Fairbanks  |  |   |          |  |
| Morse  | 20   | 6. x 6  | 14 2     | 460.00   |
| Wolverine  | 16   | 636× 7  | 2        | 800.00   |
| Poolenman  | 40   | 6 × 6   | 16 4     | 500.00   |
| Nochaway   | 40   | 51/- 6  | /4 A     | 560.00   |
| New 1018   | 24 20  | 572X 0  | 7        | 600.00   |
| Trebert  | 16.20  | 372X 0  | 7        | 390.00   |
| Trebert  | 10-20  | 479X 3  | -        | 300.00   |
| 20th Cent  | ury 12   | 554× 6  | 2        | 300.00   |
| Hall   | 12   | 514x 6  | -2       | 300.00   |
| Buffalo  | 24   | 51/2× 6   | 4        | 460.00   |
| Buffalo  | 16   | 6 x 6<br>6 x 6<br>5 x 2<br>5 x 4<br>4 x 5<br>5 x 4<br>4 full outfit<br>n—carburete | 4        | 300.00   |
| Jager  | 40   | 534× 5  | % 6      | 600.00   |
| Baldwin .  | 24   | 51/2× 6   | 3 × 3    | 400.00   |
| Brown Ta   | lbot., 15  | 4 x 4   | 34 3     | 250.00   |
| Ahove Er   | gines hav  | e full outfit   | as Pr    | opeller-   |
| High tens  | ion Ignitio  | n-carburete   | r-oiling | g system   |
| Reverse  | gear-com   | plete from F  | lywheel  | to coup-   |
| line All   | above Eng  | ines are of   | he 4 cv  | cle type   |
| nug. zan   | above Ling   | one Standard  | made     | Engines  |
| C cycle 1  | EAGL SIDIE (   | hast to come  | linaue   | Engines.   |
|  |  |   |          |  |
| OA TE TO   | Total 2 of w   | neer to coup  | mug.     | #17F 00  |
| 24 H.P.  | Lathrop,   | 2 cyl   |          | .\$375.00  |
| 24 H.P.<br>20 H.P.   | Lathrop,<br>Lathrop,   | 2 cyl   |          | .\$375.00  |
| 24 H.P.<br>20 H.P.<br>16 H.P.  | Lathrop,<br>Lathrop,<br>Lathrop,   | 2 cyl<br>2 cyl<br>2 cyl   |          | .\$375.00<br>. 360.00<br>. 275.00  |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>14 H.P.   | Lathrop,<br>Lathrop,<br>Lathrop,<br>Lathrop,   | 2 cyl<br>2 cyl<br>2 cyl<br>2 cyl  |          | .\$375.00<br>.360.00<br>.275.00<br>.260.00   |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>14 H.P.<br>8 H.P.   | Lathrop,<br>Lathrop,<br>Lathrop,<br>Lathrop,<br>Lathrop,   | 2 cyl<br>2 cyl<br>2 cyl<br>2 cyl<br>1 cyl   |          | .\$375.00<br>.360.00<br>.275.00<br>.260.00<br>.125.00  |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>14 H.P.<br>8 H.P.   | Lathrop, Lathrop, Lathrop, Lathrop, Lathrop, Lathrop, 2 cycle  | 2 cyl<br>2 cyl<br>2 cyl<br>2 cyl<br>1 cyl   | vDe.     | 375.00<br>360.00<br>275.00<br>260.00<br>125.00   |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>14 H.P.<br>8 H.P.   | Lathrop,<br>Lathrop,<br>Lathrop,<br>Lathrop,<br>Lathrop,<br>2 cycle  | 2 cyl   | ype.     | .\$375.00<br>.360.00<br>.275.00<br>.260.00<br>.125.00  |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>14 H.P.<br>8 H.P.   | Lathrop, Lathrop, Lathrop, Lathrop, Lathrop, 2 cycle Lathrop   | 2 cyl   | ype.     | .\$375.00<br>. 360.00<br>. 275.00<br>. 260.00<br>. 125.00<br>. 100.00  |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>14 H.P.<br>8 H.P.   | Lathrop, Lathrop, Lathrop, Lathrop, Lathrop, 2 cycle Lathrop 2 cy  | 2 cyl   | ype.     | .\$375.00<br>. 360.00<br>. 275.00<br>. 260.00<br>. 125.00<br>. 100.00  |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>14 H.P.<br>8 H.P.<br>6 H.P.   | Lathrop, Lathrop, Lathrop, Lathrop, Lathrop, 2 cycle Lathrop 2 cycle Rnox  | 2 cyl   | ype.     | .\$375.00<br>.360.00<br>.275.00<br>.260.00<br>.125.00<br>.100.00   |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>14 H.P.<br>8 H.P.<br>6 H.P.<br>15 H.P.                                | Lathrop, Lathrop, Lathrop, Lathrop, Lathrop, 2 cycle Lathrop 2 cycle Knox Bridgepon  | n—carburete plete from F nnes are of t ype Standard heel to coup 2 cyl  | ype.     | .\$375.00<br>. 360.00<br>. 275.00<br>. 260.00<br>. 125.00<br>. 100.00<br>. 240.00<br>. 175.00                                    |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>14 H.P.<br>8 H.P.<br>6 H.P.<br>15 H.P.<br>11 H.P.<br>9 H.P.           | Lathrop, Lathrop, Lathrop, Lathrop, Lathrop, 2 cycle Lathrop 2 cycle Knox Bridgepor  | 2 cyl   | ype.     | .\$375.00<br>.360.00<br>.275.00<br>.260.00<br>.125.00<br>.100.00<br>.240.00<br>.175.00   |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>14 H.P.<br>8 H.P.<br>15 H.P.<br>11 H.P.<br>9 H.P.<br>8 H.P.           | Lathrop, Lathrop, Lathrop, Lathrop, Lathrop, 2 cycle Lathrop 2 cycle Lathrop Bridgepon Bridgepon Auto Mi                           | 2 cyl   | ype.     | .\$375.00<br>.360.00<br>.275.00<br>.260.00<br>.125.00<br>.100.00<br>.240.00<br>.175.00<br>.168.00                                |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>14 H.P.<br>8 H.P.<br>6 H.P.<br>15 H.P.<br>11 H.P.<br>9 H.P.<br>8 H.P. | Lathrop, Lathrop, Lathrop, Lathrop, Lathrop, 2 cycle Lathrop 2 cycle Rnox Bridgepon Auto M Ferro                                   | 2 cyl   | ype.     | .\$375.00<br>.360.00<br>.275.00<br>.260.00<br>.125.00<br>.100.00<br>.240.00<br>.175.00<br>.168.00<br>.100.00                     |
| 24 H.P.<br>20 H.P.<br>16 H.P.<br>8 H.P.<br>6 H.P.<br>15 H.P.<br>15 H.P.<br>8 H.P.<br>8 H.P.<br>8 H.P.  | . Bridgepor<br>. Auto Ma<br>. Ferro<br>. Barker  | rt  |          | 168.00<br>100.00<br>110.00<br>136.00   |
| 9 H.P<br>8 H.P<br>8 H.P<br>8 H.P   | . Bridgepor<br>. Auto Ma<br>. Ferro<br>. Barker  | rt  |          | 168.00<br>100.00<br>110.00<br>136.00   |
| 9 H.P<br>8 H.P<br>8 H.P<br>8 H.P   | Bridgepor Auto Mi Ferro Barker Victor  | rt  |          | . 168.00<br>. 100.00<br>. 110.00<br>. 136.00<br>. 225.00   |
| 9 H.P<br>8 H.P<br>8 H.P<br>8 H.P   | Bridgepor Auto Mi Ferro Barker Victor  | rt  |          | . 168.00<br>. 100.00<br>. 110.00<br>. 136.00<br>. 225.00   |
| 9 H.P<br>8 H.P<br>8 H.P<br>15 H.P<br>11 H.P  | Bridgepor Auto Mi Ferro Barker Victor  | rt  |          | . 168.00<br>. 100.00<br>. 110.00<br>. 136.00<br>. 225.00   |
| 9 H.P<br>8 H.P<br>8 H.P<br>15 H.P<br>11 H.P<br>10 H.P<br>12 H.P  | Bridgepor Auto Mi Ferro Barker Victor  | rt  |          | . 168.00<br>. 100.00<br>. 110.00<br>. 136.00<br>. 225.00   |
| 9 H.P<br>8 H.P<br>8 H.P<br>15 H.P<br>10 H.P<br>12 H.P  | Bridgepot Auto Mi Ferro Barker Victor Gray Brown, 1 Universa 3 cy Fairbank   | Vew   | e        | . 168.00<br>. 100.00<br>. 110.00<br>. 136.00<br>. 225.00<br>. 190.00<br>. 245.00<br>. 200.00                                     |
| 9 H.P<br>8 H.P<br>8 H.P<br>15 H.P<br>10 H.P<br>12 H.P  | Bridgepot Auto Mi Ferro Barker Victor Gray Brown, 1 Universa 3 cy Fairbank   | Vew   | e        | . 168.00<br>. 100.00<br>. 110.00<br>. 136.00<br>. 225.00<br>. 190.00<br>. 245.00<br>. 200.00                                     |
| 9 H.P<br>8 H.P<br>8 H.P<br>15 H.P<br>10 H.P<br>12 H.P  | Bridgepor Auto M. Ferro M. Barker Victor Gray Brown, I Universa 3 cy Fairbank Ferro  | New   |          | . 168.00<br>. 100.00<br>. 110.00<br>. 136.00<br>. 225.00<br>. 245.00<br>. 200.00<br>. 260.00                                     |
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| 9 H.P<br>8 H.P<br>8 H.P<br>15 H.P<br>10 H.P<br>12 H.P<br>12 H.P<br>17½ H.P<br>17½ H.P                  | Bridgepon<br>Auto Mi<br>Ferro .<br>Barker .<br>Victor .<br>Gray .<br>Brown, I<br>Universa 3 cy<br>Fairbank .<br>Ferro .<br>Ferro . | New   |          | . 168.00<br>. 100.00<br>. 110.00<br>. 136.00<br>. 225.00<br>. 245.00<br>. 200.00<br>. 260.00<br>. 190.00<br>. 150.00<br>. 210.00 |
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| 9 H.P<br>8 H.P<br>8 H.P<br>15 H.P<br>10 H.P<br>12 H.P<br>12 H.P<br>17½ H.P<br>17½ H.P                  | Bridgepon<br>Auto Mi<br>Ferro .<br>Barker .<br>Victor .<br>Gray .<br>Brown, I<br>Universa 3 cy<br>Fairbank .<br>Ferro .<br>Ferro . | New   |          | . 168.00<br>. 100.00<br>. 110.00<br>. 136.00<br>. 225.00<br>. 245.00<br>. 200.00<br>. 260.00<br>. 190.00<br>. 150.00<br>. 210.00 |
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| 9 H.P. 8 H.P. 8 H.P. 15 H.P. 10 H.P. 12 H.P. 17½ H.P. 17½ H.P. 17½ H.P. 18 H.P. 5 H.P. 5 H.P. 6 ½ Brie | Bridgepon Auto M. Ferro Barker Victor Gray Brown, 1 Universa 3 cy Fairbank Ferro Ferro Mianus Mianus Mianus Fairbank               | Vewlinder 2 cycl  | 6        | 168.00 100.00 110.00 110.00 136.00 190.00 225.00 190.00 200.00 260.00 150.00 210.00 110.00 56.00 100.00                          |
| 9 H.P. 8 H.P. 8 H.P. 15 H.P. 10 H.P. 12 H.P. 17½ H.P. 17½ H.P. 17½ H.P. 18 H.P. 5 H.P. 5 H.P. 6 ½ Brie | Bridgepon Auto M. Ferro Barker Victor Gray Brown, 1 Universa 3 cy Fairbank Ferro Ferro Mianus Mianus Mianus Fairbank               | Vewlinder 2 cycl  | 6        | 168.00 100.00 110.00 110.00 136.00 190.00 225.00 190.00 200.00 260.00 150.00 210.00 110.00 56.00 100.00                          |
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| 5<br>73/2 | One cyl. Two cycle H.P. Ferro\$35 H.P. Specialty, new . 75 H.P. Ferro 85 H.P. Fairbanks-Morse, heavy duty 115 Two cyl. Two cycle | 12 H.P. Page & Bushman. \$95.<br>18 H.P. Ferro                         | 6 H.P. 1 cyl. Imperial,<br>new |
| 8 9 2     | H.P. Fairbanks-Morse.\$75<br>H.P. Roberts 95<br>H.P. Lackawanna 85<br>H.P. Atlantic Special 105<br>H.P. Gray 145                 | 4 cyl\$245.<br>40 H.P. Roberts, 4 cyl 265.<br>60 H.P. Fairbanks-Morse, | heavy duty with gear           |

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ALMOST as many engines as are to be displayed in the Motor Boat Show of 1920 will also be on display in the showrooms of Bruns, Kimball & Co., 153-155-157-159 West 15th Street, between 6th and 7th Avenues.

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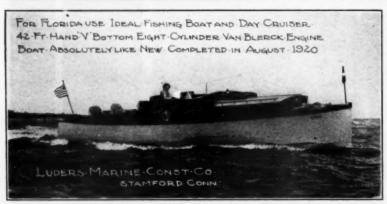
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For Sale-Latest Hand-designed 42-ft. V-bottom cruiser with 8 cylinder Van Blerck motor. Write, wire or telephone for price and full description. Luders Marine Construction Co., Stamford, Conn.



For Sale-36 ft. Hand V. bottom cruiser, equipped with two motors driving twinscrews. Delco lighting and cooking, electric fans, com plete galley outfit. Boat first class every way. Built 1916. D. B. Roberts, 51 Elm St., Hartford, Conn.

\$1,000 for best bargain can find in 25 to 30-ft. mahout. Speed 16 to 20 miles. All particulars st letter. MoToR BoatinG, Box 86.

For Sale—Sound 45 x 11 ft, 8 in. cruiser; launched new Sept., 1913; galley with ice box, coal stove, cooking utensils; stateroom; main cabin; large engine room; perfect modern 4 cycle heavy duty; purchased August, 1916; 5 berths, complete equipment. Bargain \$1,600 for quick sale. Write for photo and details. J. W. Keefe, Jr., 264 York Street, Jersey City, N. J.

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Exceptional bargains at only a fraction of original price. These engines have been completely rebuilt in our factory, worn parts replaced, everything readjusted and put in first class condition. Not simply repaired but actually rebuilt, put through the factory the same as a new engine in process of manufacture. Every Factory-Rebuilt Clay Engine is thoroughly tested and covered by our regular guarantee—in fact when refinished cannot be told from a new engine. 20 H.P. with reverse gear, \$705 (regular price \$1,175). 16 H.P. without reverse gear, \$480. Write us when you need an engine. The Clay Engine Mfg. Co., 664 East 72nd St., Cleveland, Ohio.

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Special low introductory prices on our 1921 model Watercar, an extremely dry, seaworthy cruising runabout with very unusual accommodations and speeds of 15 to 30 miles (20 to 60 h.p.). Bronx Boat Works, foot Willow Ave. (near E. 132nd St.), New York.

For Sale—1920 practically new 36 foot Elcomahogany express runabout. Address H. F. Keil. Jr., 401 E. 163rd St., New York City.

Wanted—25 ft. to 30 ft. speed boat to run 35 to 40 M.P.H. Not particular about finish. Address: A. G. Schultz, Beardstown, Illinois.

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Fur Sale: A 40 tt. raised deck cruser
complete to the minutest detail with every posible-convenience. Double statercom and saloon
sleeping five or six. Price \$3,000. Cannot be
duplicated for double. For complete description
address Yachting. c/o Motor Boating.

For Sale—Practically new, 8 cyl. Sterling
motor, 5½ in. x 63¼ in. Rated 150-180 H.P.
Cost \$3,000.00. Will sell motor complete for
\$1,500.00. An ideal powerplant for high speed
runabout or express cruiser. W. P. Laurents,
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runabout or Laurents, La.

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Right and left-hand, 215 H.P. 8 cylinder, high
speed, Van Blerck motors, two years old. Rebuilt and guaranteed. \$1,200. each. In stock.
Bowker, Holmes & Hecker Co., Inc., 259 Greenwich St., N. Y. City.

Wanted—A heavy duty marine motor, 30 to 40
H.P.—4 cycle, Sterling, Buffalo, Clay, Frisco,
Standard or other high grade make. Motor must
be in perfect condition. F. Hurting, 506 E. 55th
St., N. Y. C.



Advertising Index will be found on page 196



No. 477—For Sale—High grade Lawley designed and built 50 ft. power cruiser, 10 ft. beam, 3 ft. 9 in. draft. Large cockpit; bridge control; main cabin, toilet and galley. Crew's quarters, with toilet, forward. 50 H.P. heaving speed 12 miles. Whole cutfit in fine condition. Apply John G. Alden, 148 State St., Boston.

Young man (28), experience on fresh and salt water, sail and power vessels, desires position for winter cruise on southern bound yacht. Served two years at sea as chief boatswain's mate. Com-petent and qualified to handle any small yacht. Box 74, care of Motor BoatinG.

Wanted—Cruiser 45 to 60 feet long. Must be first class boat. Speed 12 miles or over. Send me particulars. L. Cook, 1918 Sunnyside Ave., Chicago, Ill.

rest class boat. Speed 12 miles or over. Send me particulars. L. Cook, 1918 Sunnyside Ave., Chicago, III.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, etc., required by the Act of Congress of August 24, 1912, of MoToR Boating, published monthly at New York, N. Y., for October 1, 1920. State of New York, County of New York, ss. Before me, a Notary Public, in and for the State and county aforesaid, personally appeared C. F. Chapman, who, having been duly sworn according to law, deposes and says that he is the Business Manager of MoToR Boating, and that the foilowing is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, to wit: 1. That the names and addresses of the publisher, cditor, managing editor, and business manager are: Publisher, International Magazine Company, 119 West 40th Street, New York, N. Y.; Editor, C. F. Chapman, 119 West 40th St., New York, N. Y.; Business Manager, C. F. Chapman, 119 West 40th St., New York, N. Y.; Business Manager, C. F. Chapman, 119 West 40th St., New York, N. Y.; More York, N. Y.; That the owners are: International Magazine Company, 119 West 40th St., New York, N. Y.; More York, N. Y.; That the owners are: International Magazine Company, 119 West 40th St., New York, N. Y.; Stockholders, wortgagees, and other security holders owning or holding I per cent or more of total amount of bonds, mortgages, or other securities are: Columbia Trust Company, 60 Broadway, New York, N. Y.; Lina Strauss, 27 West 72nd St., New York, N. Y.; Lina Strauss, 27 West 72nd St., New York, N. Y.; Lina Strauss, 27 West 72nd St., New York, N. Y.; Samuel Untermyer, 37 Wall St., New York, N. Y.; Samuel Untermyer, 37 Wall St., New York, N. Y.; Samuel Intermyer, 37 Wall St., New York, N. Y.; Samuel Untermyer, 37 Wall St., New York, N. Y.; Seorge J. Gould, 165 Broadway, New York, N. Y.; Steed of the company a

#### MOTOR BOATING

#### Yard and Shop

(Continued from page 56)

build some boats elsewhere as heretofore, the new plant will carry the heaviest load. They will be enabled to deal more promptly with the increasingly large number of or-ders for Sea Sleds which are being received.

#### S. A. E. Motor Boat Meeting

During the week of the Motor Boat Show the Society of Automotive Engi-neers will hold a technical meeting at the Automobile Club of America on Tuesday Automobile Cub of America on Tuesday evening, December 14. An informal dinner will precede the meeting, at which C. A. Criqui will act as toastmaster. The progress in internal combustion motor boat engines and the probable trend of their future development will be discussed by the speakers during the evening. A trip of inspection through the plant of one of the representative boat and engine of the representative boat and engine manufacturers near New York City has been planned for the afternoon of the same day.

#### New Hall-Scott Agents

The rapidly spreading popularity of Hall-Scott marine engines is evidenced by the recent appointment of the Pyke Motor & Yacht Co., of Montreal, Quebec, as Eastern Canadian distributors for this famous engine. Their show rooms will enable them to show these engines to ad-In addition they have a large vantage. In addition they have a large and flourishing boat building plant at La-chine, Quebec, devoted to the production of craft of the highest quality. In New Orleans the Aiker-Donovan Company, Inc., of 510 Canal Street, have

Company, Inc., of 510 Canal Street, nave also been appointed agents for Louisiana. New Orleans is rapidly coming to the front and high speed runabouts and ex-press cruisers are being used extensively. In adding the Hall-Scott motors to their line of other power plants they have com-pleted their assortment and are to-day able to furnish the proper size and type of motor for every requirement.

#### Middletown Declares Holiday

Holiday

November 10th will in the future be a red letter day in Middletown for it was on that day that Billie Gibb, Vice-President and Sales Manager of the Frisbie Motor Company took unto himself a wife. A Coroner's Jury headed by Wilbur Young of the Columbian Bronze Company and consisting of Rex Wadman, "Andy" Patterson of Rudder, Walter Moreton of Boston and Wm. E. Eldridge of MoToR Boating journeyed up to Middletown to help the master of ceremonies, Minn S. Cornell, prepare for the last rite of Billie's bachelorhood. Bill Gibb and his chief mourners were assembled at the Hotel Arrigoni. Wilbur Young had hardly begun to perform his duties as "Chief Dispenser of Hope", when Billie Gibb's presence was requested at the Frisbie plant.

The plant had been decorated in honor

The plant had been decorated in honor of our prospective groom and the entire (Continued on page 68)

## White Cedar Boat Boards

Jordan Bros. Lumber Co.

and Cedar Products Virginia Norfolk.

A VOID disaster by using a DIRIGO compass on that boat. All materials first class. No rubber agaskets to rot. A very hard pivot and high-grade jewel. Navy degree circle on dial. Brass and mahogany binariacles. Also new course finder and bearings instructed the control of the

EUGENE M. SHERMAN Bex 3 Bellevue, Wash.



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For Electric Lamps Pat. Jan. 30, 1917. Approved by the Underwriters. An ideal fixture for motorboats, yachts, boat houses, garages, machine shope, etc. Enables you to use light anywhere up to 25 ft. from fixture. Automatically rewinds cord when finished. Write for prices.

distance. Automatically rewinds cord when finished.
Write for prices.
THE CINCINNATI SPECIALTY MFG. CO., Inc.
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## CAPE COD 20-FT. DORY LAUNCH The Safest little family beat built. Motor housed in.

17' Sail Dory
16' Shallow Draft
16' Shallow Draft
16' Rew Beat
17' Life Saving Dory
12' Rew Beat
12' Rew Beat Also

#### IMPROVED THERMEX SILENCER

Increases Revolutions. No Back Pressure!
Cannot clog. nor collect salt; water cannot flow back to cylinder. No heating, no odor. Used free or under water—adjustable discharge. Lightest, cheapest to lustail. Free booklet shows why. Send for it today.

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155 Liverpool St.



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underlighted Compasses, Course Protectors, Bearing Finders. Every navigator should have them. Send for interesting catalogue. Ad-dress Box 45.

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Made in one, two, three or more burners. Com-plets catalogue on application to manufacturers. WILLIAM H. OTTO METAL GOODS CORP. 401 St. Pauls Ave. Jersey City, N. J.

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Build your own boat from my plans, or full s.ze paper patterns.

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Eight standard open-end wrenches, screw
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#### MOTOR BOATING

#### Yard and Shop

(Continued from page 67)

Frisbie staff, including Middletown's Famous Brass Band were on hand to help the party along. After a great deal of merriment and speech making, mostly by Billie Gibb, the party returned to the hotel where the final rites were performed. At 2:30 Billie Gibb with his "bottle of milk" left us to get ready for the big show at 9 A. M.

#### Filter Your Gas

Much of the trouble caused the motor-boatman from his carbureter is due to dirty gasoline on account of the sediment and water in it. To overcome this trouble and annoyance, the Visible Gasoline Filter Company has developed a filter that clears the gas only as it is used and feeds it to the gas only as it is used and feeds it to the carbureter in plain view of the oper-ator of the boat. The strainer is at-tractive in appearance and in keeping with the rest of the instruments installed on the modern motor boat. It comprises two glass-walled cylinders with nickel-plated caps on each end. The gasoline is feed into caps on each end. The gasoline is fed into the first of the two cylinders, where it strains upward through a chamois sack. Subsequently it passes down through the second cylinder, where its purity can be observed and its specific gravity tested by observed and its specific gravity tested by means of a small hydrometer inclosed in the second cylinder. The tremendous amount of water and sediment in the present-day gasoline can be entirely removed, resulting in much smoother and efficient running of the motor. The filtration is accomplished years slowly through tion is accomplished very slowly through a large area of chamois. This is removable and can be easily cleaned when necessary.

#### Use of Marine Glue

One of the fine arts in yacht work is the application of marine glue to the numerous seams on decks and elsewhere. The L. W. Ferdinand Co., manufacturers of many varieties of marine glues par-ticularly for this service, publish a com-plete little booklet on "How to Use These Preparations." They say in part that the Preparations." They say in part that the black glue is the best for all-round ser-vice. Further, that one should not heat more than is expected to be used up at

Heat only what is necessary for immediate use and as soon as it is half used out of the kettle, add fresh glue, keeping it stirred frequently. It should be used as soon as it is melted and not allowed to stand in the kettle. Continued boiling hardens and injures the glue.

Almost without exception, unsatisfactures and in the state of the sta

Almost without exception, unsatisfactory results in using this material are oc-

casioned by faulty application and are produced entirely by two causes.

First, if either the oakum or cotton caulking or the seam is damp when the glue is applied, as soon as the sun shines on the deck, the heat will turn this mois-

thre into steam which will force the glue up over the edge of the seam. Second, in paying the seam the ladle should be held at least an inch above the deck,—if the ladle is drawn on or close to the seam a quantity of air will be ento the seam a quantity of air will be enveloped and cannot escape before the glue becomes set. This will cause air bubbles, which in hot weather will also force the glue up over the edge of the seam leaving it hollow and unsound. The seams must be absolutely dry and clean before the glue is run into them.

If applied to old work, the old material should be dug out perfectly clean. Whatever adheres to the sides of the seam should be removed with a rase knife.

should be removed with a rase knife.



Every Boat should be Fully Equipped **EVER-WARM SAFETY SUITS** 

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Built to outlive the engine. Mica Insulation is free from troubles of other insulating materials. Brass Jackets. Price \$1.50-the cheapest plug in the long rus. Sead for booklet.

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4-Cycle Engines of Quality Six sixss—light, medium, and medium heavy duty. 3 h.p. to 20 h.p.—1 to 2 cylinders. Gasoline or kerosene. Suitable for workboats, fish skiffs, sampans, pleasure boats, etc. Working parts on lightweight models, interchangeable with ford engine parts.

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mber that Mullins Boats are guaran-for life. They cannot leak, water-log, dry

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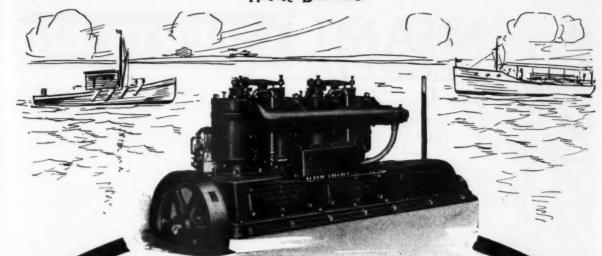
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Choosing the right power plant is the most important decision the boat purchaser has to make. It is fairly simple in a light pleasure boat where the only differences to be considered are boat speed and price. But in the heavy duty field, for work boats, houseboats or heavy duty cruisers, the most vital requirements are power, endurance and reliability.

Honest Clay Engines are designed especially for heavy boats. They are massive, rugged and heavy, built to endure any amount of punishment without faltering. They have big sturdy parts, liberal bearings and ample bore and stroke to develop their full rated power for any length of time in continuous operation. Every working part is designed for a wide margin of excess strength.

If you have a heavy boat of any type, you owe it to your boat and to yourself to know the facts about the Honest Clay. Write us.

The new Model "R" line of Honest Clays includes the following-

 Single Cylinder
 6 H.P.
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 Two Cylinder
 12 H.P.
 16 H.P.
 20 H.P.

 Four Cylinder
 25 H.P.
 35 H.P.
 50 H.P.

Write today for complete information and name of nearest agent

THE CLAY ENGINE MFG. CO.

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# LEBERTY KID

The Best Little Medium-Duty Marine Engine on the Market with Power to Spare

Every engine dealer and boat builder knows Every engine dealer and boat builder knows the demand for a high grade small engine like the Liberty Kid,—for runabouts, tenders, fishing boats, work boats, etc. A Liberty Kid on your sales floor is better than money in the bank. High grade four cycle design, valve-in-head, removable cylinder head, bronze, rocker a r m s, push-rods, plunger nump.

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Engines are being sent us for repair from all parts of the United States. Why not send us yours.

Guaranteed Rebuilt Engines with cylinders rebored, equal to new

1—6" x6" Single Cyl. Palmer...\$150.00

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F course you want the exhilaration of passing the other fellow, and you'll always do it if you will put a Bosch High Tension Magneto on your engine. They are strong and dependable.

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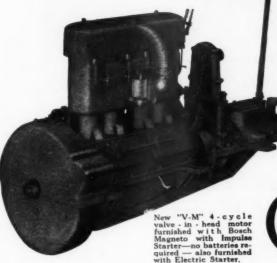
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AMERICA'S SUPREME



# Gray Marine Motors for 1920

"the engine with the big crank shaft"



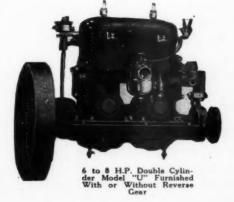
This new model V-M
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Motor History

VERHEAD valve marinemotors are acknowledged to be of greater efficiency and power than other types and in the Gray the ultimate or valve-in-head marine motor perfection has been attained.

The Gray is designed to operate on either gasoline or kerosene, it cannot backfire, it burns the fuel keenly with practically no carbon, soot, smoke or odor and lubrication troubles are unheard of in the Gray.

Our Hot-Spot Cylinder Head gasifies thoroughly the fuel used and renders it completely combustible.

Gray Two-Cycle Motors are built in models from 3 to 8 h. p. Gray Four-Cycle Motors are built in three sizes, 10 to 50 h. p. Write for FREE catalog.



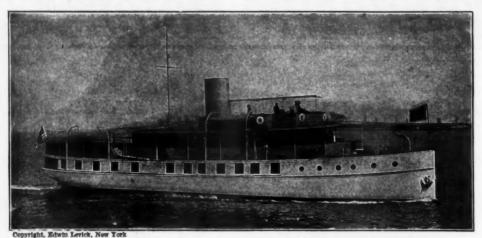


Selected for Canoes, Row Boats and Small Launches. 3-8 H.P. 2 - cycle Gray Motor. Standard the World

You can place your order now for shipment next spring or sooner, and should the price of labor or material be reduced, we will give you the benefit of the same.

By having your order on our books now, will guarantee delivery when you require your engine, and at the same time you are protected in price.

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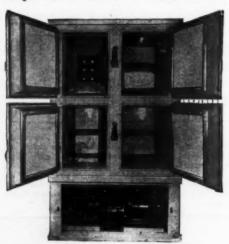


The "Gadfly", one of America's finest motor boats. Owned by Robert Cassett. Designed by Henry J. Gielow, New York. Built by Kyle & Purdy, City Island, New York. Equipped with Clothel Refrigeration.

## Clothel Electrical Automatic Refrigeration for Yacht, Motor Boat and Home

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Handsome, convenient, serviceable—Clothel is the ideal refrigeration for home or boat. Write for booklet.

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E present on the following pages the Story of the Standard Reverse Gear—what kind of a gear it is, how and where it is built, and a few other things that help to explain the wonderful service and satisfaction which more than 30,000 Standard Gear users are now receiving.

The story is short, told largely in pictures—a little journey through our factory which you will enjoy.

If you are a reverse gear user, a boat owner or prospective buyer we hope you will gain some valuable gear information and suggestions from this story. You'll find it worth reading.



STANDARD GEAR COMPANY
5928 Commonwealth Ave Detroit Mich

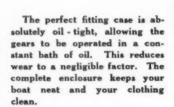


"All the Name Implies"

WHAT is your ideal of a good reverse gear? Is it Cleanliness, Dependability, Quietness, Durability, Compactness, Light Weight, Strength, Simplicity, Easy Adjustment, Smooth Operation?

All of these qualities are found in the Standard Gear. It is not a "one feature" product nor a combination of a few salient talking points, but an honest mechanism built to do its work satisfactorily from every standpoint and to outlast the engine on which it is installed.

Inside of its attractive clean-cut case is an assembly of working parts as simple and well made as a reverse gear can be. Not an ounce of necessary strength is left out; not an ounce of surplus weight is left in.

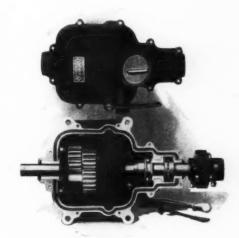




"All the Name Implies"

THE mechanisms of most reverse gears look about alike to the uninitiated. But if you are an expert you'll appreciate the superior design of the Standard. Simplicity minimizes the possibility of trouble and facilitates adjustment.

Added to the perfect Standard design are the very finest of materials and the best of machine workmanship—the kind of workmanship for which Detroit products are famous. We haven't been satisfied to build a gear just good enough; our aim is to build the best. And we honestly believe we do.



Note the oil groove and packing which makes the case oil-tight, even at the joints. Oil traps at the end of each bearing return the surplus oil to the case. Notice also the ball thrust bearing at the rear, enclosed within the case and running in an oil bath.



This is the working unit of the Standard Reverse Gear. Looks sturdy—is sturdy. Superlative quality in design, materials and workmanship.



"All the Name Implies"

WHO couldn't build an excellent product in such a factory! Light and roomy, efficiently laid out and completely equipped with the newest, best and most up-to-date machinery money can buy. And manned by skilled machinists accustomed to working to the one-thousandth part of an inch, or less.

Many of the smaller and more accurate machined parts of several of Detroit's most expensive automobiles are produced in our factory.



Where Standard Reverse Gears Are Made



Left. The turret lathe and screw machine department. Here the gear blanks are turned, and the castings machined.

Below. The gear shapers, cutters and hobbers. Our gears are all cut in our own plant by experts.



Left. Grinding department. The internal expanding ring is ground to size after splitting.

20



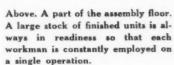
"All the Name Implies"

Right. A corner of our heat treating room, showing two of the largest carbonizing furnaces in Michigan. This is where the steel is treated, carbonized, hardened and drawn in oil, to give it the hard, yet not brittle, wearing surface.

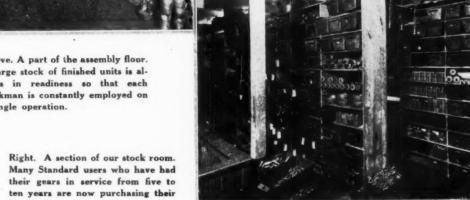
Lower Right. Our aisle of automatic machinery where the smaller parts of the Standard Gear are made. It is such machinery as this that has made America the leading manufacturer for the world. Improved quality, perfect uniformity and lowered cost are the result.







first service parts.





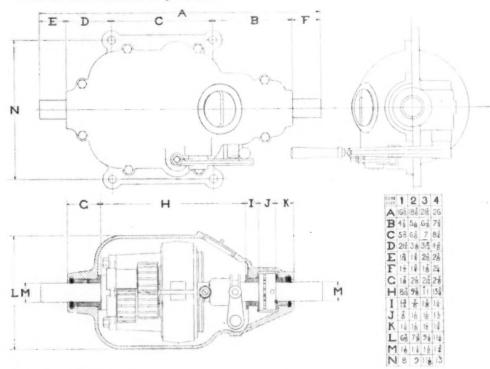
"All the Name Implies"

AND now that you have seen how and where the Standard Reverse Gear is made, don't you think it is good enough for your boat and your engine, no matter how fine they are?

We have told you only one side of the story—the manufacturing side. We haven't told you the service side—of more than 30,000 Standard Reverse Gears now in service, in all sizes and types of boats, on practically all makes of engines and in practically every part of the world. We haven't told of hundreds of letters from pleased users—people don't write reverse gear testimonials unless they are unusually well pleased.

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| Volume | I —Practical Motor Boats and Their Equipment                | 1.50 |
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| Volume | II —Practical Motor Boats Building                          | 1.50 |
| Volume | III —Practical Things Motor Boatmen Should Know             | 1.50 |
| Volume | IV—Practical Marine Motors                                  | 1.50 |
| Volume | V —Practical Motor Operation and Maintenance                | 1.50 |
| Volume | VI-Practical Suggestions for Handling, Fitting Out and Car- |      |
|        | ing for the Boat  | 1.50 |

The books measure 7 x 10 inches and are handsomely bound in cloth. Over 1,000 s. Price of Practical Handbooks \$1.50 per volume or \$7.50 per set of Six Volumes. pages. (See Complete Table of Contents on the next page.)

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#### Volume I—Designs of Ideal Motor Boats and How to Design a Motor Boat.....\$2.00

This volume describes in detail how to design a motor boat. It also contains complete plans of 30 Cruisers, Runabouts and Auxiliaries. The plans include lines, table of offsets, interior plans, profiles, construction details, etc. There is no book published at the present time which describes in everyday language the details of designing a boat according to your own tastes. The plans of Ideal Cruisers, Runabouts and Auxiliaries are complete in every particular. They include the best of the plans published in MoToR BoatinG during the past several years. The plans include boats of from 20 feet in length up to 40 feet. The drawings are all to several years. The scale and large size.

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10-foot mark boat, 12-foot outboard motor boat, 12-foot speed boat, 12-foot bangabout, 13-foot sea skiff, 16-foot sharpie, 18-foot runabout, 20-foot monoplane, 20-foot hydrorunabout, 20-foot knockabout, 20-foot tunnel stern, 22-foot V-bottom runabout, 25-foot V-bottom cruiser, 25-foot roundbottom cruiser, 28-foot cruiser (Consort II).

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Both of the Ideal Books are printed in large type on extra fine paper. They have been edited by Charles F. Chapman, editor of MoToR BoatinG.

Price of Ideal Books, \$2.00 per volume or \$5.00 per set of 3 volumes.

#### A New Book Ready December 10 Twelve Complete V-Bottom Designs Ideal Series Vol. 3

by Wiliam H. Hand, Jr. Prepared Expressly for MoToR BoatinG

Prepared Expressly for MoToR BoatinG

This new book which is now on the press will be the most valuable one ever published for the amateur builder or anyone desiring to have a V-bottom boat built by his own builder. The plans contain outboard profile, lines, inboard, construction and interior arrangement plans, sectional views and complete table of offsets. Accompanying each design is a description of the boat and a full set of specifications taking up step by step each feature of the boat's constructions, how it should be built and the proper material to use.

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Charts 25 cents each or \$1.50 per set of 12 (Series B will be sent as published).

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  No. 7—Block Island to Vineyard Sound, including Narragansett Bay.
  No. 8—Delaware Bay.
  No. 9—Chesapeake Bay, Part I, Upper Part.
  No. 10—Coast of Maine, Portland to Rockland.
  No. 11—Hudson River, Kingston to Albany.
  No. 12—Chesapeake Bay, Part II, Central Part.

Series B Charts No. 13 to 24 are in the course of preparation, and will be forwarded as ready. Series B is as follows:

- No. 13—Lake Erie—Eastern Part.
  No. 14—Lake Erie—Western Part.
  No. 15—Hudson River, New York to Kingston.
  No. 16—Lake Champlain.
  No. 17—Erie Barge Canal.
  No. 18—Massachusetts Coast.
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  No. 20—Cape Cod Bay.
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#### MOTOR BOATING PRACTICAL HAND-BOOKS

Every motor boatman has long felt the need for a really complete and comprehensive library devoted to their favorite pastime—motor boating. One of the obstacles to the accomplishment of this important work was the difficulty in finding any one writer who could cover the field in its entirety. In presenting the new series of practical handbooks, McToR BoatinG believes that the problem has been solved at last. These books are edited by Charles F. Chapman, M. E., the editor of McToR BoatinG, and they are the results of months of untiring effort on his part, together with the best of thousands of suggestions sent to him by motor boatmen themselves. The list of the contents given below will give you some idea of the vast amount of ground covered by these volumes.

#### Practical Motor Boats and Their Equipment

Volume 1.—The first volume tells you what the ideal boat for various kinds of service should be and what to look for in buying a boat. Many suggestions about decoration and hints on all kinds of equipment. All about steering gears, wireless outfits, electrical attachments, etc. Glance over the list of contents appended herewith: Hulls, Ballast and Scaworthiness; Round Bottom ws. Sharp Bilgs; What are the Advantages of Flare? I saised Deck vs. Trunk Cabin; Best Proportion of Beam to Length; Selecting a New Design; The Advantages of Bilge keels; Open or Solid Deadwood? What Makes a Hull Seaworthy? The \$1,000 Cruiser; Buying a Second-Hand Boat; Types of Bows and Sterns; Exterior Arrangement of Cruisers; The Best Cabin Arrangement; Finishing Up the Cabin; Changes in Interior Arrangement; Interior Arrangement Steering Positions; Steering Equipments for Motor Boats; Rudder; Advantages of the Outboard Rudder; Different Steering Positions; Steering Equipments for Motor Boats; Steering Gear for the Cruiser; The Steering Gear for a Runabout; Steering the Boat from the Side; The Electrical Equipment; Making and Wiring a Switchboard; Electric Lighting on a Motor Boat; The Inexpensive Lighting Outfit; Wiring the Small Cruiser; The Sterng Battery; The Dynamo Cut-Out; Wireless for a Small Cruiser; Tender for a Thirty-foot Cruiser; Building a Folding Dinghy; Installing the Boat Boom; What is the Best Galley Arrangement; Ventilating the Galley; The Galley Stove and its Installation; Making a Fireless Cooker; A Portable Cook Box; Running Water for the Cruiser; How to Build a Portable Table; A Table for the Open Boat.

#### Practical Motor Boat Building

Volume 2.—As its title implies, this volume takes up the building of your own boat. It also covers the construction of the necessary fittings such as awning, windshield, etc. Every boatman sometime or other builds a boat, and a book of this kind will save much time and prevent many mistakes. List of contents: Types of Motor Boat Fastenings; Boat Building Woods; Laying Down a Boat's Lines; Converting a Trunk-Cabin Cruiser; A Steam Box for Amsteur Builders; Joiner Between Stem and Keel; Fastening the Frames and Floors; Boring the Forgotten Limbers; Fitting the Garboard Plank; Boring the Shaitlog; Fitting the Stuffing Box; The Stern Bearings for a Cruiser; A Water-Tight Companionway; How to Canvas a Deck; Hinged Water-Tight Hatches; Making a Water-Tight Window Sash; Making a Water-Tight Skylight; How to Build an Engine Housing; How to Make an Ragine Cover; Building a Tool Locker; Constructing an Extension Transom; How to Make a Pipe Berth; An Ice-Box for a Cruiser; Installing a Toilet; How to Rig a Signal Mast; How to Make a Spray Hood; Fitting a Folding Windshield; An Awning for the Open Boat; A Cover for the Open Cockpit; Screens for the Side Light; A Support for the After Light; A Swat for the Man at the Wheel; Removable Davits for the Cruiser; The Boarding Steps; A Bow Rudder for Your Hydro; The Motor-Driven Club Tender.

#### Practical Things Motor Boatmen Should Know

Volume 3.—Navigation is one of the important subjects covered in volume three of the series. Tells you how to steer, how to increase the factor of safety, and a host of other things relative to the proper running of your boat. The chart and compass are both fully explained in a clear and comprehensive manner. The list of contents will tell you more about it; Advice for the Beginner; Lessons Learned from Experience; Good Things to Know; Increasing the Factor of Safety; Which Way Should the Boat Steer? Why a Boat Steers Badly; Why do Boats Sqrpt? Figuring the Boat's Speed; Ballasting the Cruiser; Getting Off Bottom; To Ride Out a Storm in a Metor Boat; she Why and How of Storm Oi; Preventing Fire; Handling Ground Tackle; Government Charts; Stowing the Anchor on a Cruiser; Diminishing Deviation; Preventing Electrolysis; Stowing and Using Charts; How to Make a Chart Case; Keeping a Motor Boat's Log; How to Make a Sextant; Tides and Tidal Waters; Taking Her Through the Canals; The Beat All Round Dinghy; Towing the Tender; Handling the Dory in a Seaway; Getting the Tender Aboard; Planning for a Cruise; Equipping for a Cruise; Equipping for a Cruise; Guipping of a Race Course; Measuring the Length of a Race Course; Preparing a Boat's Bottom for a Race; How to Build a Turning Buoy; Starting Boats in a Race; Stowing the Signal Flags; Fitting a Gun Mount; A Fish Box for Your Cruiser; A Cabin Wall Rack.

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Network. The best location for your engine, the ideal engine bed, the fuel tank, exhaust and countless other suggestions that will enable you to get the best results from your power plant. List of contents: Purchasing a Marine Motor; How Many Cylinders? Power per Cylinder; High Speed vs. Heavy Duty; Long Stroke vs. Short Stroke; Correct Motor Design; Changes in One's Power Plant; The Things that Cause Vibration; The Automobile Engine for a Boat; The Best Position for the Motor; The Ideal Engine Compartment; Placing the Engine in the Hull; Installing a Motor in a Canoe; Installing Power in a Yaw!; Converting a "Banker" to Power Engine Installation in a Hydroplane; Putting Power in the Rowboat; Limits of Shaft Inclination; Constructing the Engine Bed; Getting the Motor Aboard; Lining Up the Propeller Shaft; The Best Exhaust; Mufflers vs. Under-Water Exhausts; Installing an Under-Water Exhaust; Primary Batteries for Ignition; Keeping the Ignition System Dry; Installing a High-Tension Magneto; From Make and Break to Jump Spark; Installing the Gasoline Tanks; Taking Care of Extra Gasoline; Spark and Throttle Controls; Constructing a Rear Statter; Propeller of Engine and Hull; Installing a Universal Joint; Gearing Motor to Propeller Shaft; The Automobile Throttle; Harsessing the Main Engine; Rebabbitting a Wora Bearing; Should Fuel Line be Inside or Outside.

#### Practical Motor Operation and Maintenance

Volume 5.—One of the most valuable books of the entire set. Your motor's ills and how to cure them. This volume tells you how to adjust your carburetor, how to fit piston rings, how to remedy poor compression and a number of other things that will enable you to doctor your own motor. List of contents: Locating the Motor's Troubles; The Overheated Motor; Starting in Cold Weather; Overhauling a Marine Motor; How to Save Fuel; The Fuel Situation; Using Low Grade Fuel; How to Run on Kerosene; Supplying the Fuel to the Carburetor; Adjusting the Carburetor; Cleaning the Fuel Tanks; Cleaning the Gasoline Line; Stopping Up the Leak in the Tank; A Home-Made Gasoline Gauge; Carrying an Extra Supply of Oil; Mixing the Fuel and Lubricant; Remedying Leaky Compression; Killing the Carbon Jinx; Tool and Spare Parts to Carry; Removing and Replacing Fiston Kings; Repairing a Leaky Cylinder; Grinding a Motor's Valves; Setting the Valves; Timing the Ignition System; Cleaning the Water Jacket; Making and Fitting a Gasket; Patching Up a Bearing; Straightening the Sprung Shaft; Truing a Bent Propeller; Removing the Flywheel; Separating Couplings and Pipe Fittings; Changing the Shaft Hole Location; Utilizing the Exhaust; Disposing of the Bilge Water; Heating a Small Cruiser's Cabin; Operating the Outboard Motor; The Clean and Quiet Boat; Charging a Storage Battery; When the Motor Stops Unexpectedly; Making a Unit Power Plant.

#### Practical Suggestions for Handling, Fitting Out and Caring for the Boat

Volume 4.—This volume is an especially valuable one. You will find in it points covering the care of your boat that you never dreamed of before. Whether you are a beginner or a finished expert this book will give you a better knowledge of the handling of your craft than you can imagine. List of contents: Putting the Boat into Commission; Fitting Out a Thirty-Footer; Suggestions for the Beginner; Refinishing Bright Work; Keeping the Wood Surface Bright; Putting the Boat Out of Commission; Laying Up an Unsheltered Boat; Hauling Out for the Winter; Covering the Boat for the Winter; Launching from a Wharf; Correcting Faults; Lengthening Out the Boat; Moorings and Buoys; Taking Steps to Safeguard the Anchor; What to Use in the Bilge; Preserving the Wood in Boats; Emergency Rigs for the Cruiser; Auxiliary Sails for the Cruiser; Providing an Emergency Rudder; Preparing for Southers Waters; Stopping the Troublesome Leak; Replacing a Broken Plank; Removing Broken Lag Screws; Raising the Boat's Stern; Clearing the Propeller; Protecting the Bow and Stern; Open Boat Sleeping Quarters; Ventilating the Cabin of Small Cruisers; Converting the Open Boat to a Cruiser; Making a Cover for the Open Boat; Preventing Electrolysis; Building a Club Float; A Floating Boathouse; Constructing a Lenning Stage; Building the Marine; Keeping the Thief Out; A Place for Your Shore Clothes; Stowing for Life Preservers; The Winter's Alterations; What Changes Shall I Make; The Satisfactory Bilge Pump; The Pressure Water System; Making a Pelevus; Your Storm Curtains; Life-Saving Equipment; The Absent Owner's Anchor Light; Mounting the Reverse Gear.

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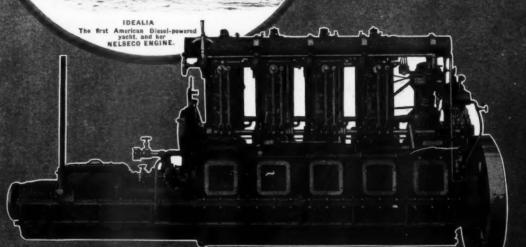


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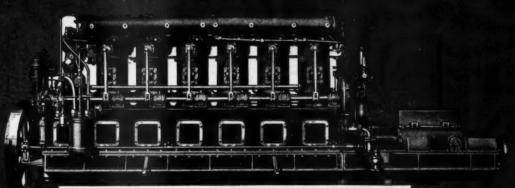
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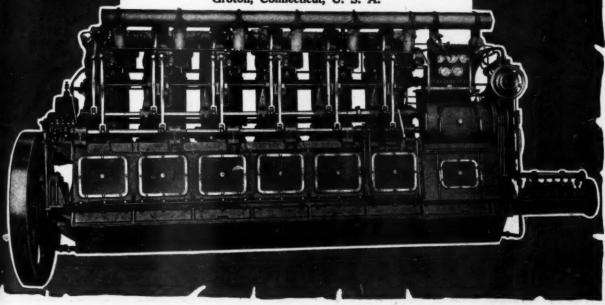
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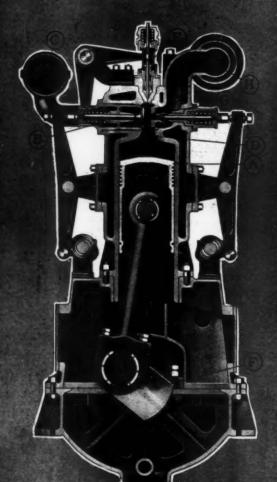
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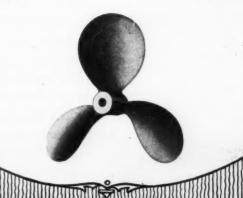
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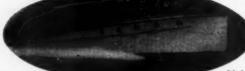


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UR boating friends will be interested in knowing that we are developing some most unusual and important refinements for 1921 pleasure craft. Higher speeds and more comfortable boats are two special features. It is hoped that these may be announced and possibly exhibited, at the New York Motor Boat show in December. Buyers of express cruisers and fast runabouts will be given the opportunity to discuss these innovations at that time. Those who do not visit the show may secure full details by notifying the ALBANY BOAT CORPORATION, Watervliet, N. Y., that such literature, as prepared, will be acceptable.



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### Four-Cycle Marine Motors for 1921

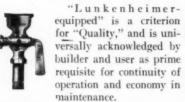
54 to 75 Horsepower Four-Cycle Motors

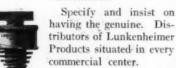
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| Rated |                               |        | Bore &     |            | -              | of     |             |
| H. P. |                               |        | Stroke     | R.P.M.     | Wt.            | Valves | Ignition    |
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|       |                               |        | 61218      |            |                |        | Opt.        |
| 60    | Murray & Tregurth             | 1a 4   | 715×10     | 375        | 4,667          | L.     | Opt.        |
| 60    | Palmer                        |        | 638x8      | 450        | 3,800          | T      | A. K.       |
| 60    | Standard                      | -4     | 632x8      | 600        | 3,200          | L      | Dbl.        |
| 60    | Union                         | 3      | 9 x11      | 320        | 7,400          | T      | M. & B.     |
| 60    | Wolverine                     | 3      | 9½x12      | 325        | 6,327          | I.     | М.          |
| 60    | Wright Reliable               | 6      | 6 x73/2    | 450        | 4,630          | H      | M. I. S.    |
| 60    | Wright Reliable               | 6      | 71/2×9     | 350        | 5,065          | H      | M. I. S.    |
| 62    | Wisconsin                     | -4     | 5%x7       | 800        | 1,290          | T      | М.          |
| 65    | Acme                          | 4<br>6 | 834×10     | 350        | 6,675          | H      | Opt.        |
| 65    | Acme                          | 4      | 634×735    | 500<br>340 | 4,825          | H      | Opt.        |
| 65    | Atlas Imperial                | 1      | F 8 - 6    |            | aro            | T      | M. & B.     |
| 65    | Elco                          |        | 5 *x614    | 1,000      | 650            | Ť      | M.          |
| 65    | Fay & Bowen                   | 6      |            | 1,000      | 1,480          |        | М.          |
| 65    | Frisco Standard               |        |            | 360        | 8,650          | T      | Opt.        |
| 65    | Wisconsin                     | 6      | 5.1x5½     | 1,000      | 650            | T      | M.          |
| 66    | Speedway                      | 6      | 412×512    | 1,200      | 1,200          | L      | M.          |
| 70    | Automatic                     | 4      | 732x9      | 500        | 4,800          | L      | J. S.       |
| 70    | Buffalo                       | 6      | 7 x9       | 350        | 4,850          | L.     | Dbl.        |
| 70    | Harris                        | -4     | 8 x10      | 350        | 5,850          | H      | M.          |
| 70    | Vulcan                        | 6      | 71/2×81/2  | 425        | 4,500          | T      | J. S.       |
| 75    | Automatic                     | 3      | 10 x14     | 275        | 8,000          | L      | Opt.        |
| 75    | Automatic                     | - 6    | 712x9      | 350        | 6,500          | r      | Opt.        |
| 75    | Automatic                     | 6      | 632x8      | 500        | 4,250          | I.     | M.          |
| 75    | Doak                          | -3     | 932x11     | 300        | 10,000         | H      | M.          |
| 75    | Frisbie Valve-in-he           |        | 6 x6       | 750        | 1,600          | H      | J. S.       |
| 75    | Gaeth                         | 6      | 512x8      | 600        | 3,000          | T      | M.          |
| 75    | Knox                          | 6      | 7 x8       | 550        | 4,500          | L      | J. S.<br>M. |
| 75    | Scripps                       | - 6    | 4 4 x 6    | 1,500      | 1,290          | ŗ      | M.          |
| 75    | Speedway                      | -4     | 5%x7       | 1,000      | 1,850          | L      | М.          |
| 7.5   | Standard                      | 4      | 8 10       | 400        | 5,300          | L      | M. & B.     |
| 75    | Sturtevant                    | 4      | 412x6      | 1,600      | 700            | T      | Μ.          |
| 75    | Twentieth Century             |        | 612x812    | 475        | 4,500          | L      | Dbl.        |
| 75    | Vulcan                        | 4      | 834×1012   | 375        | 5,500          | T      | J. S.       |

|      |                     |     |                     |            | Location        |              |               |  |  |
|------|---------------------|-----|---------------------|------------|-----------------|--------------|---------------|--|--|
| P.   |                     | is. | Bore &<br>Stroke    | R.P.M.     | Wt.             | of<br>Valves | Ignition      |  |  |
| 0    | Acme                | 6   | 71/4×9              | 425        | 6,950           | H            | Opt.          |  |  |
| 0    | Acme                | 6   | 614x712             | 600        | 4,825           | H            | Opt.          |  |  |
| 0    | Atlas Imperial      | 4   |                     | 320        | 8,000           | H            | M. & B.       |  |  |
| 0    | Brennan             | 4   | 6 x6                | 800        | 1,250           | L            | B. & M.       |  |  |
| 0    | Buffalo             | 4   | 634 x9              | 800        | 2,600           | L            | Dbl.          |  |  |
| 0    | Enterprise          | 3   | 10 x1236            | 320        | 12,300          | H            | M. & B.       |  |  |
| 0    | Frisco Standard     | 3   | 9%x12               | 280        | 12,600          | T            | Opt.          |  |  |
| 0    | Hicks               | 3   | 10 x1236            | 450        | 9,200           | H            | M. & B.       |  |  |
| 0    | Niagara             | 4   | 634x7               | 1,000      | 1,650           | T            | J. S.         |  |  |
| 0    | Palmer              | 6   | 752x10              | 450        | 5,600           | T            | A. K.         |  |  |
| 0.0  | Union               | 3   | 10 x12              | 310        | 10,700          | T            | M. & B.       |  |  |
| 0.   | Winton              | 6   | 6½x9                | 450        |                 | L            | M.            |  |  |
| 0    | Wisconsin           | 6   | 5%x7                | 800        | 1,545           | T            | M.            |  |  |
| 60   | Wolverine           | 3   | 11 x12              | 325        | 6,747           | L            | M.            |  |  |
| 5.5  | Acme                | -8  | 834 x 101/2         | 325        | 8,200           | H            | Opt.          |  |  |
| 5.5  | Frisco Standard     | 4   | 8%x1016             | 350        | 11,730          | T            | Opt.          |  |  |
| 55   | Sterling            | 4   | 512x634             | 1,200      | 1,700           | T            | М.            |  |  |
| 5    | Sterling            | 6   | 5½x6%               | 800        | 2,450           | T            | D. & M        |  |  |
| 55   | Union               | 4   | 9 x11               | 330        | 10,700          | T            | M. & B.       |  |  |
| sā.  | Wisconsin           | 6   | 51/2×7              | 800        | 1,585           | T            | M.            |  |  |
| 10   | Automatic Prod. Gas |     | 10½x15              | 250        | 0 500           | H            | J. S.         |  |  |
| 90   | Doak                | 6   | 8 x10               | 350        | 9,500           | î.           | M.            |  |  |
| 90   | Standard            | 6   | 612x8               | 600<br>800 | 1 015           | Ť            | Dbl.          |  |  |
| 10   | Wisconsin           | 6   | 5%x7                | 350        | 1,615           | Ĥ            | M.            |  |  |
| 90   | Wright Reliable     | 6   | 712x9               | 400        | 7,000           | H            | M. I. S.      |  |  |
| 00   | Acme                | 4   | 854 x 10<br>10 x 14 | 275        | 8,900<br>11,780 | L            | Opt.          |  |  |
| 00   | Automatic           | 4   | 81/2×10             | 500        | 6,100           | Ĺ            | Opt.          |  |  |
| 00   | Automatic           | 4   | 10 x12              | 300        | 8,200           | i.           | J. S.<br>Dbl. |  |  |
| 00   | Buffalo<br>Doak     | 4   | 936x11              | 300        | 12,000          | H            | M.            |  |  |
| 00   | Elco                | 6   | 54x6                | 1,000      | 1,000           | T            | M.            |  |  |
| 00   |                     | 6   | 8 x10               | 350        | 7,300           | H            | M.            |  |  |
| 90   | Honest Clay         | 4   | 83/2×10             | 350        | 7,500           | H            | M. I. S.      |  |  |
| 00   | Murray & Tregurtha  |     | 735x10              | 400        | 6,018           | i.           | Opt.          |  |  |
| 00   | Standard            | 6   | 8 x10               | 400        | 8,000           | î.           | Dbl.          |  |  |
| 00   | Sterling            | 4   | 536x684             | 1,400      | 1,400           | Ť            | M.            |  |  |
| 00   | Van Blerck          | -1  | 534x6               | 1,500      | 1,560           | Ť            | B. & M        |  |  |
| 10   | Wolverine           | 3   | 1235x14             | 325        | 10,117          | Ĺ            | M.            |  |  |
| 10   | Frisco Standard     | 3   | 11%x15              | 250        | 16,085          | T            | Opt.          |  |  |
| 10   | Union               | 3   | 12 ×15              | 280        | 17,600          | T            | M. & B        |  |  |
| 10   | Union               | 4   | 10 x12              | 330        | 12,350          | T            | M. & B        |  |  |
| 15 . | Harris              | 4   | 10 x14              | 225        | 12,850          | H            | M.            |  |  |
| 15   | Speedway            | 6   | 6% x812             | 600        | 5,000           | L            | M.            |  |  |
| 15   | Sterling            | 8   | 51/2×63/4           | 800        | 2,750           | T            | D. & M        |  |  |
| 20   | Automatic Prod. Gas | 4   | 101/2x15            | 250        |                 | T            | I. S.         |  |  |
| 20   | Frisco Standard     | -4  | 934x12              | 320        | 15,583          | T            | Opt.          |  |  |
| 20   | Niagara             | 6   | 614x7               | 1,000      | 2,350           | T            | J. S.         |  |  |
| 25   | Acme                | 6   | 834 x 1032          | 375        | 10,800          | H            | Opt.          |  |  |
| 25   | Hall Scott          | -4  | 5 x7                | 1,700      | 1,100           | H            | Delco         |  |  |
| 25   | Sterling            | 6   | 51/2x63/4           | 1,200      | 2,250           | T            | M.            |  |  |
| 25   | Union               | 6   | 9 x11               | 320        | 14,400          | T            | M. & E        |  |  |
| 25   | Winton              | 6   | 8 39                | 450        |                 | L            | M.            |  |  |
| 30   | Speedway            | 6   | 5% x7               | 1,000      | 2,400           | L            | B. & M        |  |  |
| 45   | Sterling            | 6   | 51/2×6%             | 1,400      | 1,750           | T            | M.            |  |  |



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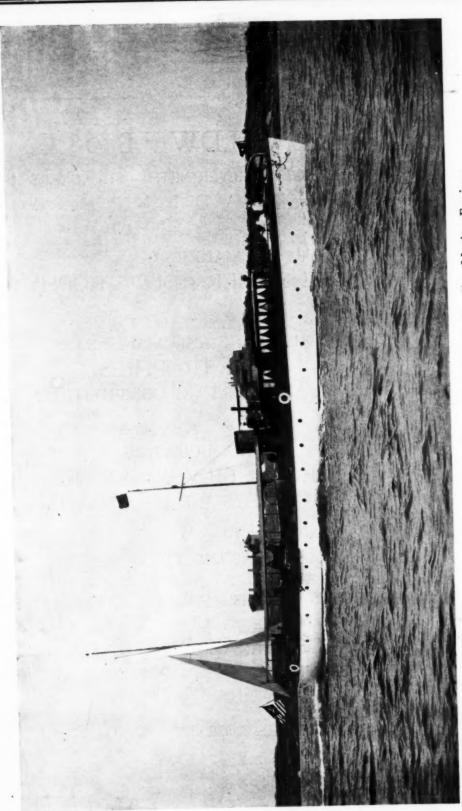
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That was Kipling's way of putting it, and a great many people carry the idea still farther and think a yacht's a matinee girl—good to look at, and all that, but not so hardy after all.

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ern yachts—we can give you a long list of them—get their tremendous power from Winton gasoline marine engines. Among these is Mr. K. Van Riper's "Alacrity" pictured above—118' length, 15' 6" breadth, 5' 6" draft—powered with two 9½" x 14" Winton gasoline marine engines.

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The Gierholtt makes your rowboat, tender or canoe a real motor boat, capable of good speed and ready to run wherever there's water enough to float the boat, regardless of weeds, sunken logs or rocks. The propeller is protected. A youngster can carry it, attach it to the boat, start the motor and run it anywhere.

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The ability to run at full speed in the shallowest water is a most important feature—possible only with the Gierholtt Direct Drive. Should the propeller become fouled with weeds, swing it inboard like this (without removing) and you can free it instantly. You can steer perfectly and turn the boat in its own length.



### Four-Cycle Marine Motors for 1921

(Continued from page 88)

150 to 200 Horsepower Four-Cycle Motors

| Th             |                 | No of Done &    |                   |        | Location |                       |                  |  |
|----------------|-----------------|-----------------|-------------------|--------|----------|-----------------------|------------------|--|
| Rated<br>H. P. | Motor           | No. of<br>Cyls. | Bore &            | R.P.M. | Wt.      | of<br>Valves          | Ignition         |  |
| 150            | Automatic       | 6               | 8½x10             | 500    | 9,200    | L                     | J. S.            |  |
| 150            | Automatic       | 6               | 1014x15           | 250    |          | T                     | J. S.            |  |
| 150            | Buffalo         | 6               | 10 x12            | 300    | 12,800   | T                     | ДЫ. 13           |  |
| 150            | Doak            |                 | 91/4×11           | 300    | 18,000   | 11                    | M. 4             |  |
| 150            | Speedway        | 6<br>6          |                   | 1,200  | 1,900    | H<br>L<br>L           | M                |  |
|                |                 | 0               | 5%x7              |        | 1,000    | T.                    |                  |  |
| 150            | Standard        |                 | 81/2×11           | 400    | 1 505    | H                     | M. & B.          |  |
| 150            | Sterling        | 4               | 5%×6%             | 1,600  | 1,525    | 11                    | Dual M.<br>Dist. |  |
| 150            | Union .         | 4               | 12 x15            | 290    | 22,750   | T                     | M. & B.          |  |
| 150            | Van Blerck      | 6               | 5%x6              | 1,500  | 1,900    | T                     | B. & M.          |  |
| 150            | Winton          | 6               | $612\pi9$         | 900    |          | L.                    | M.               |  |
| 160            | Niagara         | 8               | 634x7             | 1,000  | 3,250    | T                     | J. S.<br>M.      |  |
| 160            | Speedway        | 6               | 812x10            | 550    | 5,000    | L                     | M.               |  |
| 160            | Wolverine       | 6               | 11 x12            | 330    | 11,765   | T<br>L<br>T<br>L      | M.               |  |
| 170            | Sterling        | 8               | 51/2×63/4         | 1,200  | 2,600    | T                     | M.               |  |
| 175            | Frisco Standard | 4               | 11%x15            | 275    | 22,630   | T<br>H<br>L<br>T<br>H | Opt.             |  |
| 175            | Harris          | 6               | 10 x14            | 225    | 16,800   | H                     | M.               |  |
| 175            | Speedway        | 8               | 5%x7              | 1,000  | 2,900    | 1                     | М.               |  |
| 200            | Automatic       | 6               | 12 x16            | 200    |          | T                     | LS               |  |
| 200            | Doak            | 4               | 1214x15           | 285    | 30,000   | Ĥ                     | I. S.<br>M.      |  |
| 200            | Hall Scott      | 6               | 5 x7              | 1,700  | 1,300    | 11                    | Delco            |  |
| 200            | Speedway        | 8               | 5%x7              | 1,200  | 2,350    | I.                    | M.               |  |
| 200            | Sterling        | 8               | 516x684           | 1,400  | 2,400    | T                     | M.               |  |
| 200            | Winton          | 8               | 61/2×9            | 900    |          | T                     | M.               |  |
|                | Winton          | 6               | 01/21/4           | 450    |          | T.                    | M.               |  |
| 200            | Winton          | 6               | 93/2×14<br>11 ×15 | 330    | 16,630   | L                     | M.               |  |
| 200            | Wolverine       | 8               | 11 110            |        |          | Ť                     |                  |  |
| 200            | Van Blerck      | 8               | 534x6             | 1,500  | 2,275    | 1                     | B. & M.          |  |

### Four-Cycle Motors Over 220 Horsepower

|                |                    |                 |                  | Location |        |              |                    |  |
|----------------|--------------------|-----------------|------------------|----------|--------|--------------|--------------------|--|
| Rated<br>H. P. |                    | lo. of<br>Cyls. | Bore &<br>Stroke | R.P.M    | . Wt.  | of<br>Valves | Ignition           |  |
| 220            | Standard           | 6               | 10 x11           | 460      |        | L            | M. & B.            |  |
| 225            | Union              | 4               | 141/2×18         | 225      | 36,400 | T            | M. & B.            |  |
| 225            | Union              | 6               | 12 x15           | 300      | 30,600 | T            | M. & B.            |  |
| 225            | Sterling           | 6               | 5%x6%            | 1,600    | 2,000  | H            | Dual M.<br>Dist.   |  |
| 250            | Automatic Prod. Ga | s 6             | 13½x18           | 200      |        | T            | J. S.<br>M.        |  |
| 250            | Speedway           | - 6             | 11 x12           | 450      | 11,400 | L<br>H       | M.                 |  |
| 250            | Sterling           | 8               | 536x634          | 1,700    | 1,495  | 14           | M.                 |  |
| 250            | Union              | 4               | 1514x20          | 200      | 49,785 | T            | M. & B.            |  |
| 275            | Frisco Standard    | 6               | 1134×15          | 300      | 28,000 | H            | Opt.               |  |
| 300            | Doak               | 6               | 1214x15          | 285      | 43,000 | H            | M.                 |  |
| 300            | Standard           | 6               | 12 x14           | 350      |        | L            | M. & B.            |  |
| 300            | Sterling           | 8               | 634 x9           | 1,000    | 5,600  | T            | Dual M.            |  |
| 300            | Sterling           | 8               | 5% x6%           | 1,600    | 2,800  | Н            | Dual M.<br>& Dist. |  |
| 300            | Union              | 4               | 16 x21           | 210      | 55,700 | T            | M. & B.            |  |
| 325            | Union              | 6               | 1436x18          | 225      | 50,400 | T            | M. & B.            |  |
| 375            | Union              | 6               | 1514x20          | 200      | 69,100 | T            | M. & B.            |  |
| 400            | Murray & Tregurth: | 6               | 754×9            | 1,400    | 3,350  | T            | M.                 |  |
| 500            | Standard Dbl. Act. | 6               | 12½x13           | 350      |        | Ť            | M.&B.              |  |



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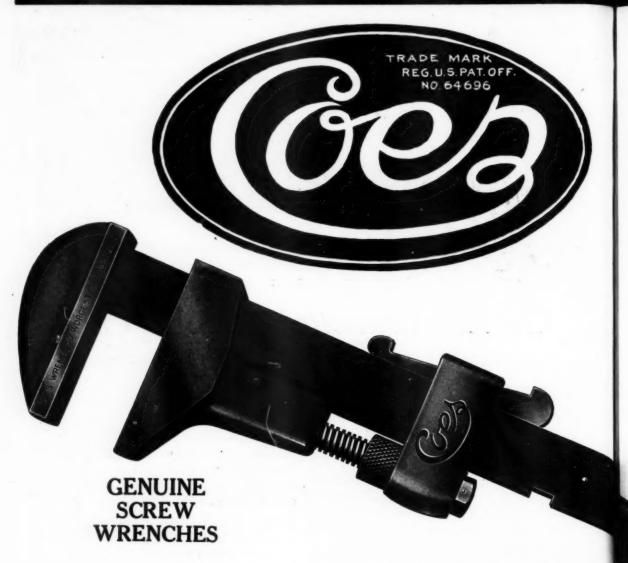
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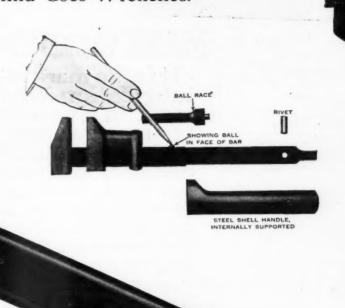
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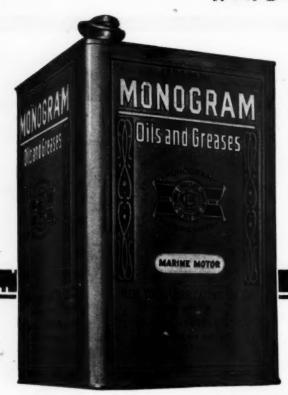
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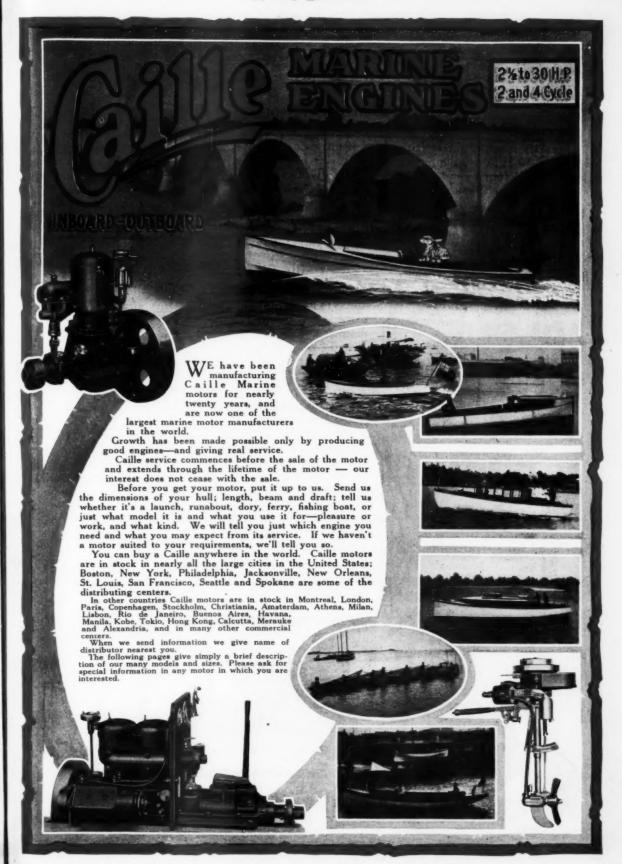


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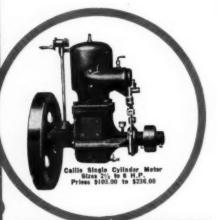
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the type and size of motor best meeting your individual needs. When writing, be sure to tell us the length, beam and draft of your boat. Also speed desired and service for which boat is used.



### Caille Single Cylinder Motors

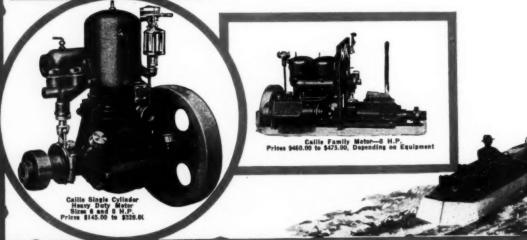
These motors are made in 2½ H.P., 4 H.P., 6 H.P. and 8 H.P. Medium and Heavy Duty models. Furnished for use in fresh or salt water. Battery, magneto or weather-proof ignitor ignition systems. Just the right motors for open boats or small cabin cruisers.

### Caille Double Cylinder Motors

Double cylinder motors in 8 H.P., 14 H.P. and 20 H.P. sizes. Light, compact and sturdy, well balanced and practically vibrationless. Lubrication is as nearly automatic as possible, simple and all parts lubricated by positive oiling system. Cylinders and manifolds cooled by circulating water system operated by plunger pump, the best pump used on marine motors, as it wears slowly and is not ruined by grit. Full brass pump always furnished. Operate in gasoline or kerosene equally well. Battery or magneto ignition as ordered.

Caille Family Motor, illustrated below, is the finest small motor on the market. Electric self-starter and automobile control.





20

Caille Five Speed Meter Price \$130.00

### AILLE

### ROWBOAT MOTORS

We manufacture two models in rowboat motors with exclusive features which cannot be obtained in any other motor for rowboats.

Nothing experimental, but each motor has been used for several years. The little motors are simple, reliable and easy to run. Men, women and children all use Caille rowboat motors.



is the highest development in rowboat motors. It clamps to the square stern of any rowboat by simply turning two thumbscrews. It will drive a boat about 8 miles an hour. Develops about 2 H.P.

This motor provides five positive speeds without varying the speed at which the motor runs. Speed changes are controlled by raising or lowering the steering handle. When in uppermost position you go forward at high speed; by lowering the handle one notch you can travel at trolling speed. You can run up to a pier and stop the boat without stopping the motor by lowering handle to neutral position. When it is desired to resume boating simply drop the handle another notch and the motor will back the boat away from the pier slowly until the pier is cleared, and then by

placing handle in lowest position you can back quickly until you are ready to go forward again. You then raise the handle to highest position and off you go. It's just like operating a big launch.

And you don't have to crank this motor, either. And you don't have to crank this motor, either. It is equipped with a starter. Simply pull a little handle and zip! away you go. So simple and easy a child can start it. Prevents aching muscles and blistered hands. Other features of the Caille Five-Speed motor include a magneto built into the flywheel and Beautifully fin-Used water-cooled muffler on exhaust. Beautifully fin-ished in French gray with polished trimmings. Used in salt or fresh water with no change in equipment.

### Liberty Drive ROWBOAT MOTOR

For shallow or weedy rivers and lakes, this motor has no equal. It pivots on the stern of the boat in has no equal. It pivots on the stern of the boat in both up-and-down and sideways movement. It will drive a boat anywhere it will float, and goes through weeds like an eel. Develops about 2 H.P. and sends boat through the water at 3 to 9 miles an hour. Weighs about 72 pounds. Thousands in use.

### The Caille Bantam Motor

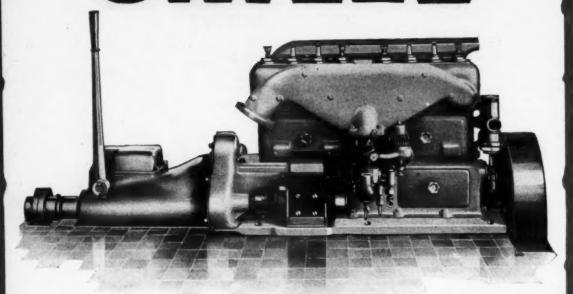
While this motor is a bantam in size, it's game as a powerful fighting cock when in action. It weighs only 40 pounds, but it will send a 16-foot canoe along at 9 to 12 miles an hour and a 16-foot rowboat at 7 to 9 miles an hour. Can be easily installed. Ideal for akiff, dinghy, rowboat or canoe. Motor runs forward or backward and has a wide range in speeds. Special literature on rowboat motors on request.

Callie Bantam Met Price \$75.00

Caille Liberty Drive Motor Price \$75.00

We also manufacture stationary or industrial engines in sizes from 1½ H.P. to 10 H.P.

### CAILLE



### **Aristocrat Motor**

Four Cycle

Four Cylinder

Electric Starter and Light

**Bulkhead Control** 

THE finest motor of its size in the world. It is the ideal motor for launches, runabouts and light cabin cruisers up to 35 feet in length.

This motor is entirely enclosed, quiet and clean. All parts are easily accessible through convenient hand hole plates and removable valve covers. Its equipment is the best the market affords. Has "Bosch" magneto, "Schebler" carburetor, "Willard" storage battery, and "Northeast" electric starter—the same kind of starter used on over 500,000 Dodge motor cars. Can be furnished with hand operated rear starter if preferred.

The reverse gear is of our own manufacture, completely enclosed and of the positive action type. Provides forward, reverse and neutral speeds.

Both intake and outlet are cast in a single piece manifold, providing a hot-spot intake, improving carburetion and giving maximum power from minimum fuel. The Caille Aristocrat is the first marine engine to be equipped with the hot-spot principle.

The Caille Aristocrat is finished in a beautiful French gray enamel and has nickel plated trimmings. In appearance, it will harmonize with the most beautiful boat. In service it will meet every requirement of the most exacting user. Send for detailed specifications. Then have your boat builder install the Caille Aristocrat in your boat.





The Home of Calife Perfection Motors. This \$1,000,000.00 Plant and the Entire Calife Organization are at Your Sarvice



The Caille Perfection Motor Co., 411 Caille Bldg. Detroit, Mich.



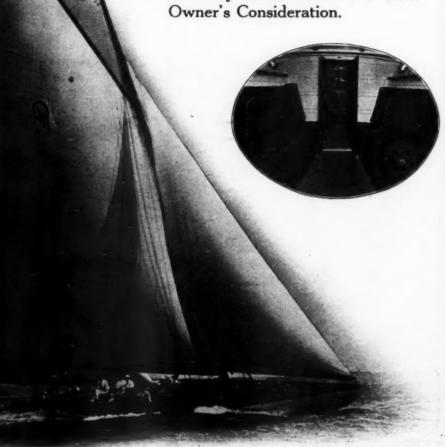
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Its unyielding strength ends the usual spark plug troubles caused by marine engine temperature variations and vibrations.

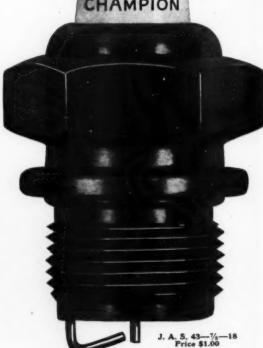
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### WORLD'S SPEED RECORD

Averaging 70.4 miles per hour, the "Miss America" won the 1920 Gold Cup Race at Detroit—the motor boat championship of America.

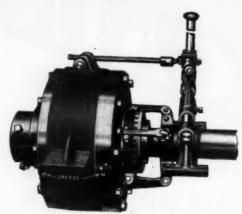
"Miss America" also broke all world's motor boat speed records from one to thirty miles. In the I mile champion-ship trials for the Lake George Trophy "Miss America" skimmed through the waters at a speed of 77.85 miles per hour—the fastest time ever made by a motor boat.

"Miss America" used Sinclair Gasoline and Sinclair Motor Oils.

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Special type for race boats and hydroplanes.



Joes High Power Gear
For smaller speed and high powered boats.

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80%-88% Reverse Speed Ratio

Compactness of design, great holding power and absolutely dependable transmission have given Joes Gears first place in the estimation of the foremost race boat owners and builders. They have found Joes Gears the ideal connection between power and propeller. Joes Gears are adaptable to all kinds of speed boats and hydroplanes.

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See Joes Reverse Gears, One-way Clutches and Safety Rear Starters at the New York Motor Boat Show, 67-69 Mezzanine



SELECTED by leading work beat engine manufacturers because of their high reverse speed ratio; smooth, positive action and wonderful durability.

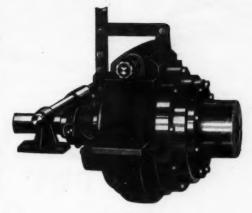
### **JOES GEARS**

80%-88% Reverse Speed Ratio

High reverse speed ratio means efficiency in operating your beat; it means the margin of safety that averts disaster. Smooth, positive action means minimum strain on your gear; the prompt obedience of your propeller to your reverse lever. Durability is the result of right construction, and means the greatest economy in the long run.

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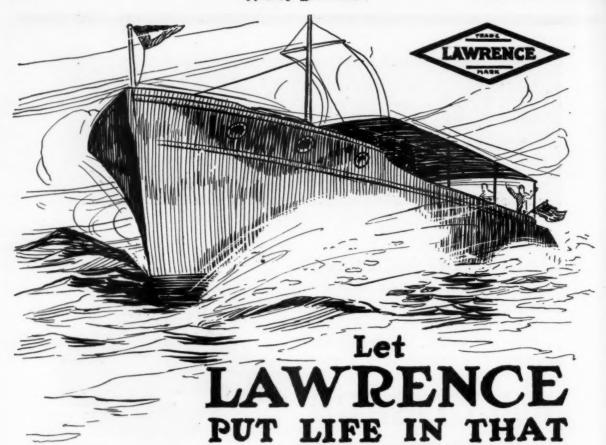


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85% Reverse Speed Ratio.



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POWER, Speed, Dependability, Durability and Economy are built-in qualities of Palmer Engines. They are strictly high-quality machines, built of the best material obtainable, made in an up-to-date plant and perfected by experienced engineers.

The first successful marine engines built in New England were built by Palmer Bros. Palmer

Engines still embody the same superior qualities upon which their reputation was founded. They can be operated on Gasoline or Kerosene and are

designed to give their rated horsepower at normal revolutions.

Palmer Engines are manufactured in three types—two cycle single and double cylinder type, four cycle medium duty type and our heavy duty type. Palmer Engines are manufactured from

2½ to 85 Horsepower, 1 to 6 cylinders, and are highly satisfactory for pleasure and commercial uses.

Let us tell you the correct size and type of motor most suitable for your boat.



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New York,
Philadelphia,
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D



### Kermath Marine Motors

Receive a Wonderful Endorsement by the Builders of Mullins' Non-Sinkable Steel Boats

MORE than 60% of America's leading boat manufacturers use Kermath Engines as standard equipment. They equip their boats with what they know are reliable motors to assure themselves of success with their customers.

As the Mullins Body Corporation of Salem, Ohio, states it: "Your hull may be most perfectly designed, it may be strongly and substantially constructed, you may add a most beautiful finish to this hull. In fact, so far as the human eye can perceive, it is a creation of grace and beauty. But if you make the mistake of installing a motor that is not a success you have lost all and your boat is a failure."

The Mullins Body Corporation is the largest builder of stock motor boats in this country. They use more marine engines in one season than any other in the business. Their success in selling motor boats to the public depends to a large extent upon the selection of a motor that gives complete satisfaction to all who are users of their boats.

The Engineering Department of this large corporation, being fully aware of this fact, selected

practically all the best grades of marine motors that were available. In their own plant they conducted a series of most exhaustive tests with these motors.

The result of these tests was the decision to use Kermath Motors as standard equipment in all of their boats.

During the last five years hundreds of the well-known Mullins Non-Sinkable Steel Boats have been powered with Kermath Motors, and they take pride in the unequalled record of not having even one Kermath motor failing to prove satisfactory to its owner.

After five years of continual testing and investigation the world's largest manufacturers of motor boats still continue to use Kermath motors as standard equipment. Is this not an assurance to you, when buying an engine for your boat that by choosing a Kermath your selection will be a correct one?

Write for our interesting free Kermath booklet. Address Dept. "D."

4 Cylinder, 4 Cycle, 12, 16, 20 and 40 H.P. Prices \$450 to \$1650 — Immediate Delivery

KERMATH MYG CO.

Advertising Index will be found on page 196



### A Motor of Extreme Excellence

THE Kermath 40 is a strong, husky engine, designed for the purpose of driving heavy cruisers and working boats. It has the power that makes it dependable for day in and day out service, no matter how large the load or how continuously it is in use.

In order to gain this extra strength, the bearing and all working parts are made extremely large.

The oiling system is clean, quick and efficient. All bearings as well as the Paragon reverse gear being lubricated by pressure feed. The oil is cleaned of all sediments by a screen each time it circulates. This screen can be removed and cleaned while the engine is running. No wrenches are necessary—you can do it with your hands in one minute's time.

All parts of the motor are enclosed. This makes it a unit of cleanliness. It is even practical to install this motor in an engine room painted white. When it comes to operation and control it surpasses the expectations of everyone who has ever handled a motor of this type.

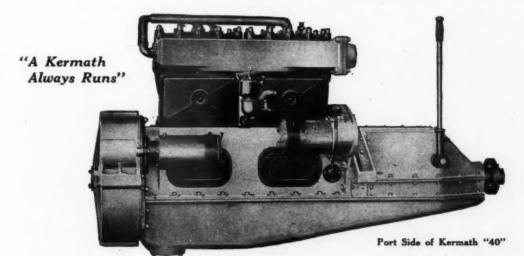
This wonderful Kermath 40 is an example of what good engineering can accomplish in producing an extremely smooth operating marine motor.

Good design, painstaking workmanship and careful assembly have made this engine that is without an equal.

Back of this motor is the prestige of the Kermath Manufacturing Company, who are the recognized builders of America's most dependable marine motors.

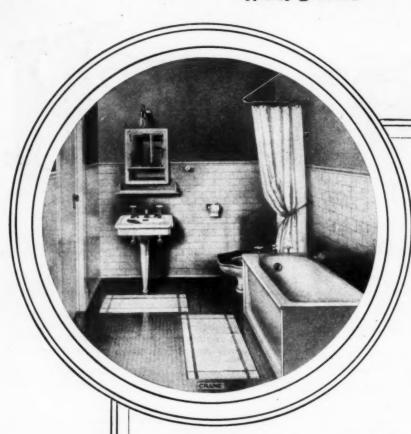
Write us for specifications and information about the Kermath 40. Address Dept. "D."

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### CRANE

### Plumbing Fixtures Motor Boats

insure equipment of a dependable quality, both in service and appearance.

The above illustration includes: a "New Undine" enameled iron built-in corner bathtub, over which is installed a concealed shower with Crane temperature regulator valve. The closet is the "Purus" with open front and back "Whale-bone-ite" closet seat and flushing valve. The lavatory is the "Idalia," supported on leg and fitted with the "Securo" quick draining waste.

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See the Burger "Boats Beautiful" Exhibit at the Motor Boat Show.

### "A 50-foot Ship"-36 feet long

When clocks were the only time pieces, folks said they could never be reduced to pocket size and be accurate. Yachtsmen, similarly, long doubted that 50-foot quality, efficiency, seaworthiness and beauty—could ever be put in a 36-foot ship.

But today we have watches—and Burger cruisers.

In fact Burger 36-foot cruisers—Mower-designed and Burger-built—go beyond imitation of their bigger predecessors. Like watches, they have accomplished a certain refinement of appearance, nicety of design and detail, balance of power and grace—that makes the bulkier model seem garish and clumsy by comparison.

Every convenience, every luxury, every merit of a 50-foot cruiser—at a 36-foot standardized cruiser price. Write for our new illustrated catalog, describing this cruiser in every detail.



A large bridge deck where all may gather; all controls on bridge deck. Two light and airy cabins with full head room—two toilets. Engine room well ventilated, power plant completely accessible, full head room at forward end. Fully equipped galley. Power plant a Scripps Model D four-cylinder, four-cycle motor; 35 H. P. electric starting and lighting system. Speed 31 miles tor hour. Marine thumbine, 6thnrs and

ana tighting system.

Speed 11 miles per hour. Marine plumbing, fittings and furnishings of the highest grade. The price, \$4,950, includes complete cruising equipment. Throughout, the boat is superior in every manner to any cruiser of similar character at its price. Thoroughly, substantially and KNOWINGLY constructed. A cruiser of long life, beautiful appearance, comfortable accommodations and highly satisfactory performance.

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The Burger 26-foot Runabout is about the classiest small boat ever launched. Complete details will be furnished upon request.



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That's why you'll find no boating investment paying higher returns than this powerful engine.

Giant valves, oversize water-jacket, large bronzebacked bearings and a leak-proof oiling system are Doman features which contribute to the long life and low upkeep of this power plant.

Special kerosene-burning equipment optional.

Get the facts about the Doman before you re-engine your old boat or buy a new one.

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### LAY YOUR PLANS NOW

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He can proceed with the assurance that he will have plenty of company, as more new boats were added to the pleasure fleets the past season than in many years. All signs point to a greater growth and prosperity of the game in 1921 than ever before.

Go to the National Motor Boat Show at the Grand Central Palace and you will obtain many new and valuable pointers which will assist you in perfecting your plans.

In the carrying out of these plans the CARPENTER service will be of the greatest assistance. Our long familiarity with the boatman's requirements enables us to give expert advice and our immense stock facilitates filling orders in the shortest possible time.

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The Standard Oil Company's Bargs, "Delivery No. 5." Powered With a 300 H.P. Standard Engine

## As in War, the STANDARD Serves Greatest in Peace

Just as the World Powers in war standardized their sub-chaser fleets with the STANDARD engine, so are they in peace largely standardizing their fleets with this engine for the even bigger work at hand of serving commerce.

And for the identical reason.

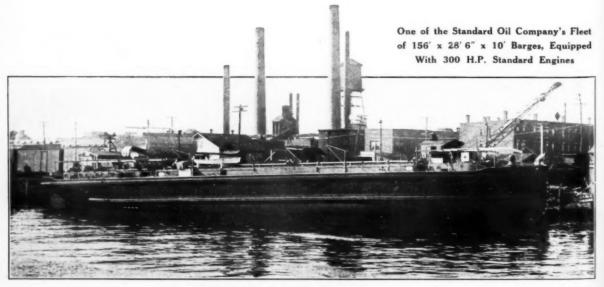
That the STANDARD engine has proven greatest of all as measured by world service.

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#### STANDARD MOTOR CONSTRUCTION COMPANY

178 Whiton St.

Jersey City, N. J.



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Crockett's Spar Composition is the only varnish which will last a season on

deck

Some varnishes stand ammonia but ammonia is unnecessary around a boat: others stand alcohol which is out of fashion as is known. Crockett's Spar Composition resists atmosphere better than any other

transparent finishing material.

THE DAVID B. CROCKETT COMPANY
BRIDGEPORT, CONNECTICUT
THE BISSELL VARNISH COMPANY, Successor

Send for booklet "How to Varnish a Boat" and do it today



LIDWINA Wins



The Sallan Trophy

#### RELIABILITY

Competing against other Express Cruisers, the LIDWINA III returned from the Detroit races in September bearing with her the coveted Sallan handicap trophy.

The LIDWINA III, formerly the SPEEJACKS, was designed and built by us in 1910.

The recent performance at Detroit of this nationally known boat is, naturally, very gratifying to both the owner and ourselves. As builders of both hull and engines, we feel more than proud of her achievement.

The winning of the gold cup by the LIDWINA III after ten years of active service speaks for itself.

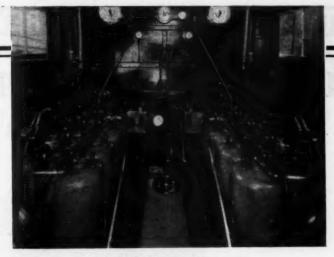
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The Engine Room of Lidwina III

#### **SERVICE**

The record of the LIDWINA III tells the story of our boats and engines—built for service.

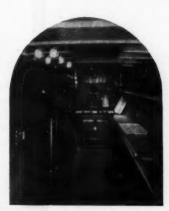
For over 35 years we have built more than 3,000 hulls, ranging from 20 to 230 feet in length. We manufacture the famous Speedway engine with which we power our hulls. In the larger yachts we install steam propelling machinery which we also produce at our factory.

There's no mistaking the service that Consolidated built boats render.

Correct in design—built master-fully—skillfully powered.



Exhibiting at the New York Motor Boat Show



Lidwina's Galley

#### THE JOHNSON MARINE REVERSE CEAR

#### THE BALL BEARING GEAR



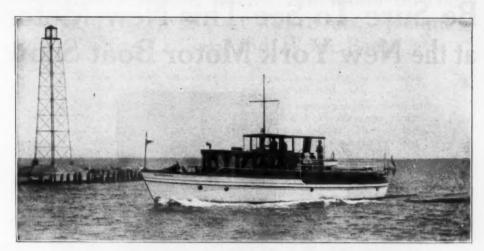
THE Johnson Ball Bearing Reverse Gear is not the development of a day. It has required the accumulated effort of twenty years—marked by constant refinements in reverse gear designs, and by consistent superiority in reverse gear performance—to bring the Johnson Gear to its present perfection, and to its pre-eminent position in the eyes of the boating public.



Address inquiries to Department 25

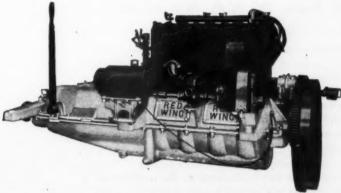
# Red Wing Characters THE MOTOR WITH POWER TO SPARE

#### Thorobreds Drive "Cassonia II"



SHE'S a Bear—this "Cassonia II"; one of the largest, roomicst, finest motor yachts in Chicago waters. She's a 60 footer, has 12' 6" beam and draws 4' 8" of water. Her power plant is two model F Red Wing 28-36 H.P. Red Wing THOROBRED Marine Motors. "She does 12 miles an hour", says F. P. Choate, her owner and 10 to 11 cruising. I have never had a moment's trouble with these engines and they are absolutely first class in every respect."

#### The Model F Thorobred



matic in all operations, is silent, sturdy, trouble proof and of exceedingly beautiful design. Don't merely buy a "motor"—get a real one while you're at it. They burn either kerosene or gasoline.

The motors in "Cassonia II" are the famous Model F THOROBREDS, 28-36 H.P. detachable cylinder head type—the same as are used with equal success in boats of all types all over the world. The motors in "Cassonia II" are equipped with 12 volt 2 unit electric starters and are fully equipped in every respect. Their bore is 4 1/16", stroke 5"; 2" crank shaft. Like other THOROBRED Models the Model F is practically auto-exceedingly beautiful design.

Get our literature now.

#### RED WING MOTOR COMPANY

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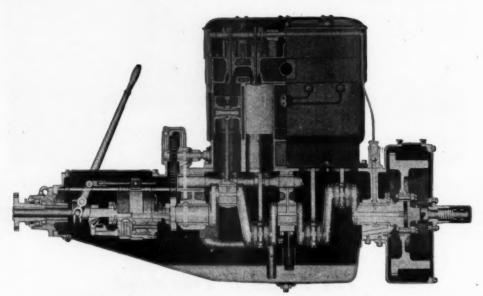
Red Wing, Minn., U. S. A.

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"Steady Service"

# Be Sure To See This New Motor at the New York Motor Boat Show



#### The New Knox 20 H.P. Marine Motor

Make a mental note right now that the one thing you must not fail to see at the New York Motor Boat Show is the new Knox 20 H.P. Marine Motor. Plan to give this exhibit plenty of time because you will want to examine the motor and have every feature explained to you if you are interested in the fine points of marine motor construction, or are planning the purchase of a motor of about this size.

This will be the first public showing of the new motor. It is the first popular size marine model produced by the Knox Motors Company, an organization famed for the quality of its products and one of the oldest and best known builders of high grade automotive engines. The appearance of a new marine motor, designed and built in the Knox way, is an event of real importance to every boat owner, boat builder and engine dealer.



"Steady Service"

#### A Quality Motor for Medium Duty or High Speed Work in Fast Runabouts, Medium Size Cruisers and Work Boats

Within the past season or two a new class of engine has been created—new standards of efficiency established.

Up to this time, all of the really notable new types have been in the larger sizes, restricted consequently in both price and power to the largest, fastest or most expensive boats. The 20 h.p. Knox is the first medium size motor in the new efficiency class, suitable for boats of average size.

There isn't a single experiment in the Knox design but all the latest and best principles of automotive engineering practice have been coordinated and combined into a motor which has no equal in the marine market today.

This is a valve-in-head motor, with removable cylinder head carrying all the valve parts. The entire assembly is quickly removable for valve grinding and carbon cleaning. The insides of the combustion chambers and cylinder heads are machined all over, giving absolute uniformity in compression space. Valves are seated directly against the cylinder head without the use of cages, thereby bringing the cooling water directly against the valve seat metal.

The lubrication of this engine is particularly interesting. It is of the full pressure, internal feed type and the oil is carried under pressure to every bearing, including the reverse gear and thrust bearings, rocker arm shaft, circulating and bilge pumps and even the interior of the reverse gear itself!

The following brief specifications will tell you merely whether this is the type of motor for your boat—only an inspection of the motor itself can show you what a remarkable achievement it is.

Four cylinders
Bore 31/2", Stroke 5"
Valves in cylinder head
Removable cylinder head
Valve mechanism enclosed
Single one-piece camshaft
Heated intake manifold

Water cooled exhaust manifold
Large drop-forged crank shaft
ead Noiseless timing gears of special design
head Separate circulating and bilge pumps
closed Furnished with or without electric starter
shaft High Tension magneto ignition
old Reciprocating parts carefully balanced
Full pressure internal lubrication

#### And the Price

We are saving this important detail for announcement at the Show. It will be remarkably attractive for an engine of this size and quality. Our plans for quantity production of this model have enabled us to set a price which brings it within the reach of every buyer and builder who wants a real first-class engine of 20 h.p.

If you don't get to the Show, don't fail to write for full description and prices

KNOX MOTORS ASSOCIATES
SPRINGFIELD MASSACHUSETTS U. S. A.



STONE & WEBSTER Incorporated 147 Milk St., Boston Boston, Mass., September 8, 1920

Mr. John L. Shellington, e/o The Gray & Prior Machine Company, Hartford, Connecticut.

Dear Sir:

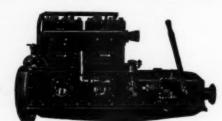
I want to let you know how well satisfied I am with the Gray & Prior engine which I had installed this summer on my forty-foot retuiser. The engine is sturdy and free from vibration and ran perfectly, never giving me a single minute's trouble. I am impressed with the simplicity of the engine and with its excellent design. All the bolts and nuts are large and easily accessible. The engine drave my boat at a speed of about ten miles an hour and the gasoline consumption was at the rate of about 2½ miles per gallon.

If you wish to refer any prospective cus-tomers to me. I shall be very glad to tell them of my experience with your engine, for it has certainly been most satisfactory in every way.

(Signed)

Yours very truly, W. H. BLOOD, Jr.

#### **Experience Built It**



Gray-Prior Model D-4, Bore 41/2", Stroke 8". Built in one size only.

#### Experience Chooses It

Mr. Blood's unsolicited letter of commendation states that his GRAY-PRIOR Model D-4 is entirely satisfactory in every way and Mr. Blood is only one of many hundreds of GRAY-PRIOR users.

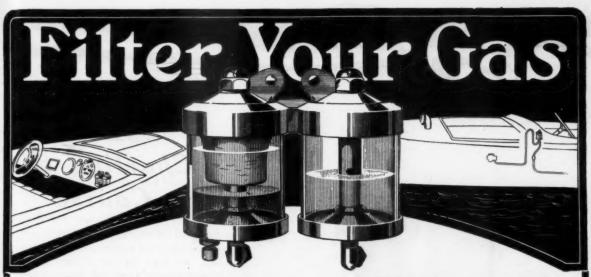
The GRAY-PRIOR embodies all that is practical and modern in marine engine construction, it is the engine that most completely fills the existing need of a "better engine."

The GRAY-PRIOR Catalog will be sent to any one interested in a marine power plant that is "built up to a standard—not down to a price."

#### THE GRAY & PRIOR MACHINE CO.

56 Suffield Street,

Hartford, Conn., U. S. A.



#### ER-LOWER

Dirty gasoline causes nine-tenths of your engine trouble. No matter how careful you are your gas is bound to collect dirt, dust and refuse, and water is continually seeping in from "sweating" tanks and pipes. The result is weakened driving power, carbon deposits, constant readjustment of your carburetor, increased running cost and actual danger to your boat and yourself.

Cleans Your Gas, Increases Your Engine Power and Cuts Running Costs

Feed clean gas into your carburetor and give your engine a chance to make good. Enjoy the pleasure of having an engine that responds to your slightest touch with a verve and life it never had before. How many times have you been in a tight place when you needed power quick to avoid a smash? You'll get it—sure—if your boat is equipped with a Gas-co-lator, because clean gas means sure power and perfect carburetion. That means more engine revolutions, more boat speed, lower fuel cost and greater comfort and safety for yourself and your guests.

#### HOW IT WORKS

Gas-co-lator is a handsomely finished device made of nickeled steel and heavy tested steamgauge glass. It attaches on your instrument board, bulkhead or engine and can be seen in operation at all times. A small pipe taps the feed from the gas tank and runs the gasoline reed from the gas tank and runs the gasoline into the left barrel of the Gas-co-lator. There it is strained through chamois—the only perfect strainer—and the cleaned gas run into the right barrel and thence to carburetor and engine. The rust, dirt, water, etc., are drained off through the plug in the bottom. Gas-co-lator is made for use on either gravity, vacuum or pressure feed.

#### WHAT IT DOES

Filters your gas and makes it absolutely clean and pure.

Gets full explosive value from every ounce of

gasoline.

Gives more power and miles per gallon of for your fuel. Elimigasoline and lower cost for your fuel. Eliminates carbon by causing complete combustion. (Carbon is caused chiefly by the unburned im-

purities in dirty gas.) Keeps your spark plugs clean. Gives perfect carburetion and eliminates carburetor adjustments.

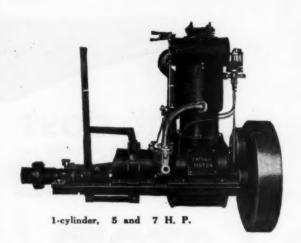
#### **FULLY GUARANTEED**

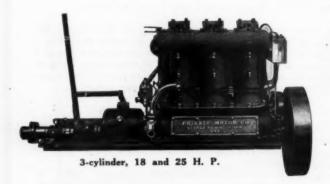
We guarantee the Gas-co-lator to thoroughly clean and filter your gas. If you are not satisfied after a fair trial your money will be refunded without protest. Thousands of Gas-co-lators are already in use. Do it now.

Write for full description, prices and name of nearest dealer. Make it a point to equip your boat with a Gas-co-lator at once if you want to secure the greatest pleasure, safety, efficiency and economy in running your boat. Write us to-day.

VISIBLE GASOLINE FILTER COMPANY, 1426 South Wabash Ave., Chicago, Illinois, U.S.A.







## Charting the Course

SOME twenty years ago a Connecticut engine builder planned a marine motor quite different from any type of marine motor known.

All valves were to open directly into the cylinder heads, and the spark was to fire straight into the combustion chamber. This would center the full impact of the explosion squarely on top of the piston and thus derive the maximum of horse power from the gas exploded.

#### Testing the Chart

Gradually his plans were perfected, and the "Frisbie Valve-in-Head Motor" was constructed and put to the severe test of actual use.

That was 20 years ago. To-day Frisbie Valve-in-Head Motors have made good in practically every field of medium duty service. Fisherman, commercial and work boat owners, and pleasure seekers find their ideal motor in the "Friendly" Frisbie.

#### Frisbie Motor Company

7 College St. Middletown, Conn.



## Frisbie an' I

Meet Us at the

Advertising Index will be found on page 196

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#### The Pilot

As the use of Frisbie Valve-in-Head Motors grew general, the valve-in-head advantages became universally recognized and many well known manufacturers are now following the course first charted by that far sighted Connecticut engine builder a score of years ago.

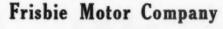
#### Full Speed Ahead

We are glad of this impetus to the development of marine motors. We believe there is a bright future for the motor boat industry, especially in work boat and commercial service.

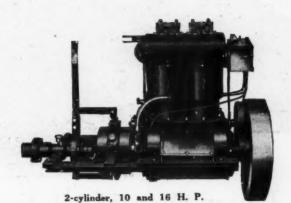
As it is honest in construction, simple in operation, and reliable in performance, the Frisbie Valve-in-Head Motor will render a very vital service in these fields.

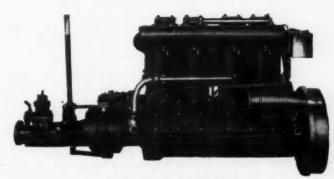
Made in 1, 2, 3, 4 and 6 cylinder sizes, all four cycle, ranging from 5 to 75 H.P.

Catalog and name of nearest dealer on request.



7 College St. Middletown, Conn.





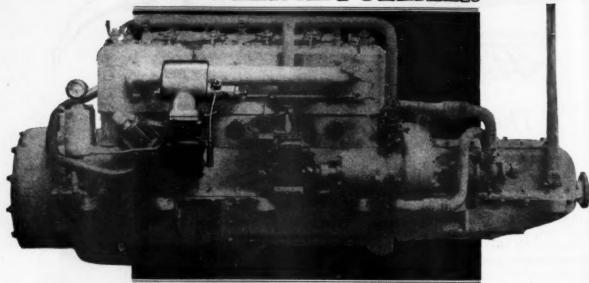
4-cylinder, 30 and 40 H. P.



Motor Boat Show

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#### VAN BILERCK FUEILIZER



#### A Unique Van Blerck Engineering Achievement

This exclusive Van Blerck feature now standard equipment on every new Van Blerck engine

WITH the development of the Fuelizer, the Van Blerck engineers have achieved the hitherto impossible—supplying perfect combustion of all grades of gasoline at all engine speeds.

Van Blerck owners enjoy the exclusive assurance of freedom from carbon troubles, spark plug fouling, cold weather starting troubles, dangerous oil dilution and, most important of all, a complete range of speed control from dead slow to full speed instantly without any backfiring or stalling.

Every motor engineer has known for years that the proper application of heat will break up a "wet" mixture. How to apply the heat has always been the problem—now solved by the Van Blerck Fuelizer which applies not only the right

degree of heat at the right place—but more important still—it applies the heat at the right time—when the engine is cold at starting; and maintains an ideal heat—not overheat—under all running conditions.

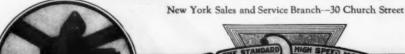
In brief the Fuelizer works as tollows: A small part of the mixture is drawn into the Fuelizer and exploded into hot gas by the spark plug. This hot gas is injected into heater around manifold and into "wet" mixture in the main manifold. It heats up and breaks up the "wet" mixture into a dry vapor, which explodes completely in the cylinders. No time is lost in warming up.

A Van Blerck achievement. Exclusively Van Blerck and now standard equipment on all Van Blerck engines. Write for detailed information.

#### VAN BLERCK MOTOR COMPANY

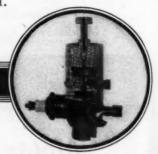
Also Makers of High Duty Commercial Motors

OFFICE AND WORKS AT MONROE, MICH.

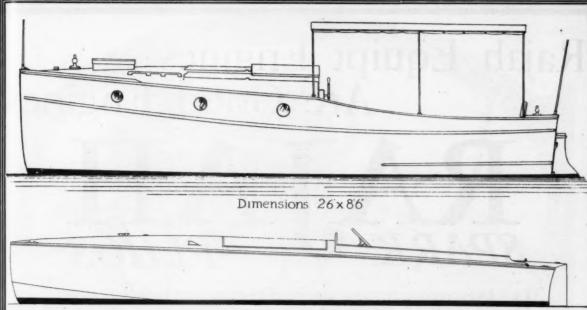








1920, Rex W. Wadman, Inc.



Dimensions 22'x56'

# The Richardson Standardized Cruiser and Runabout

Knock down frames or complete outfits of the highest type boats at the lowest possible cost.

Bull right at the right price. Boats that will fit the average man's pocketbook. Reliable, sturdy and seaworthy. A runabout that skims delightfully over the waves. A cruiser always ready for week-end trips; designed for those that enjoy fishing and short cruises. Built where quality reigns supreme.

Write for literature.



RICHARDSON BOAT COMPANY

370 Sweeney St.

North Tonawanda, N. Y.

DE

### Rajah Equipt Engines Are Good Engines

# PLUGS

RAJAH equipt engines are good engines, not merely because they are Rajah equipt, but because manufacturers of good engines buy good plugs,—and Rajah Spark Plugs are good plugs.

So when you see a Rajah equipt engine at the Show or on the dealer's floor, or you notice it in the manufacturer's catalog, just jot this down as a visible indication of the builder's honesty of purpose and careful attention to details.

Rajah is one of the oldest and best known spark plugs on the automotive market, and one of the known best. It is remembered apart from ordinary plugs, not because of any questionable peculiarity of design, but because of its excellence of construction and consequent excellence of service.

The quality of Rajah service has advertised this plug more effectively than all the printers' ink and magazine space we could buy.

Waterproof Rajah Plug-\$1.50

Standard Rajah Plug-\$1.00

Giant Rajah Plug-\$1.25



The New Waterproof Rajah Plug, designed especially for motor boats. Waterproof, shockproof and break-

#### Try This On Your Marine Engine

IF you have never used a full set of Rajah Plugs in your marine engine, you still have a new boating sensation to experience—the sensation of complete engine confidence. You may not notice much difference the first day or the first week but after a season or so of perfect service without a single misfire or a moment's delay for spark plug trouble you'll realize why Rajah Spark Plugs make and hold so many loyal friends. Buy a set today.

If your dealer doesn't sell Rajah Plugs, send us his name and we will see that you are supplied, postpaid.

The Rajah Thrust Clip, Hook Clip, Short Clip and Primary are finished with ferrules to fit any size cable. Look for the trade mark on every clip.



Manufactured by Rajah Auto-Supply Co., Bloomfield, N. J., U. S. A.



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# Let a LEBBY SEARCHLIGHT GuideYou

D<sup>O</sup> you use your boat for business or pleasure? In either case you invite accident and even death unless you use at night a dependable searchlight to locate buoys and docks, and to avoid fixed and floating menaces.

The powerful, parallel beam of light projected by a Lebby Searchlight mounted on your deek or pilot house roof makes your course on the darkest night a White Way of safety.

You're safe with a Lebby. Pioneer among searchlights for small craft it has always led in improvements of design and construction and now stands supreme as the most powerful and efficient incandescent searchlight on the market today.

Set your course for the Lebby Exhibit at the New York Motor Boat Show. Examine carefully the latest Lebby Searchlights and have them demonstrated to you.

Don't miss the Lebby Exhibit. If you can't make the Show this year write us for information and prices, giving us the size and type of your boat.



Note carefully these points: Built of Solid Brass, Specially Brilliant V-Type Filament

Lamp.
Candle Power (14" size) 175,000.
Less than Four Degrees Beam Diver-

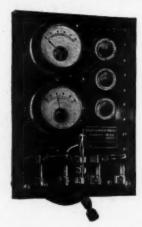
gence.
Picks up Buoys 34 Mile Away.
Focussed from the Outside.
Sizes—7 inch; 10 inch; 14 inch.

Lebby Lighting
Apparatus

WITH Ignition Supply. These outfits (patented) have been in public service for over six years, and have proved themselves of correct design and efficient operation.

On exhibition at New York Show.

Send for Special Bulletin.



Lebby Products Department

SOUTHLAND STEAMSHIP COMPANY

Savannah

Georgia



#### The Burger 36-Footer

Mass production mastered through an honorable record on Government work during the War period, 30 years of experience in the building of high grade boats, and the genius of the veteran designer, Charles D. Mower, have been combined in a noteworthy contribution to the Motor Boat field. The Burger Boat Company of Manitowoc, Wisconsin, is now concentrating every effort on the standardization of a single type, high class, bridge desk cruiser—a safe, roomy, comfortable boat fully equipped with every modern device and convenience.

In keeping with the high standard established by the craft, nothing but an honestly good reliable power plant would do, the final choice being a SCRIPPS Model "D", 4-cylinder, 4-cycle, medium duty motor with electric starting and lighting system. Three of the leading builders of standardized boats have this past year adopted the SCRIPPS as standard equipment, based on performance rather than price.

In cruisers it is particularly necessary to incorporate SCRIPPS reliability and built-in service, in which motor boat men in every clime have always relied upon steadfastly, even before the Scripps-powered "Detroit" made its memorable trans-Atlantic voyage.

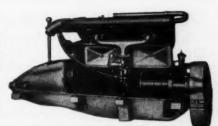
Scripps power-plants are used in boats of every description—cruising, runabout, speed, and commercial types. The power ranges run from 10 to 125 horsepower in 2, 4 and 6-cylinder. Some use gasoline exclusively, others are fit for burning either gasoline, kerosene or distillate.

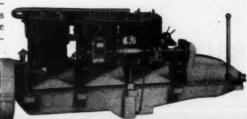


631 Lincoln Ave..

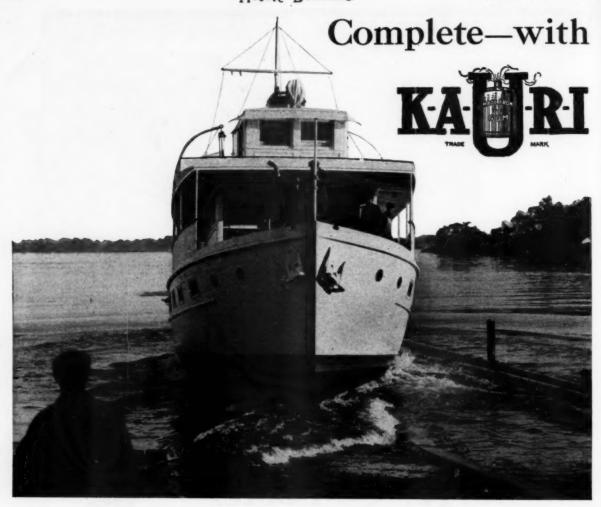
Detroit, Mich.







D



WHEN specifications were laid down for the motor house-boat, "Masquerader", it was stipulated that she be finished with the most serviceable and durable varnish that could be found.

And the College Point Boat Corporation, who designed and built her, were determined that the completed job should conform in every particular with their own high standards of design, workmanship and finish.

Therefore, it is particularly fitting that the "Masquerader" has been fin-

ished throughout with Kauri Varnish and Enamel.

Kauri Spar Varnish is used extensively by boat-builders and private owners. It is guaranteed not to crack, turn white in salt water or fresh, or to lose the brilliancy of its lustre.

A cordial invitation is extended to all to visit our double exhibit at the National Motor Boat Show at the Grand Central Palace, December tenth to eighteenth, Booths 26 and 27.

#### BROOKLYN VARNISH MANUFACTURING CO.

Brooklyn, N. Y.

Los Angeles, Cal.



#### High Class High-Speed-Pleasure-Craft

Dustin Farnum's "ELEDA"

a HACKER-BUILT 31-Footer, Liberty powered, wins the NORDLINGER-TROPHY, in three straight heats, at Los Angeles, Calif., in very rough water. MISS LOS-ANGELES, also HACKER-BUILT won same race in three straight heats in 1919.

ELEDA is an all Mahogany Gentleman's Runabout, and will do over 50 miles.

HACKER 29 FOOT SPECIAL



Pronounced by Experts, to be the most successful Gentleman's Runabout of its size in America. Powered with the four and six cylindered Hall-Scott motors. Guaranteed speeds not less than 32 and 36 miles per hour.

We have two of these ready for Florida delivery. Better get busy.



"SNAP-SHOT"

HACKER double cockpit type Runabout. Five passengers in forward cockpit. And five in aft cockpit. Her GR-Sterling drives this outfit close to 29 miles.

#### 21 FOOT STANDARDIZED RUNABOUT

THE BIGGEST LITTLE BOAT EVER BUILT

AN ABSOLUTELY HIGH CLASS OUTFIT, COMPLETELY EQUIPPED SPEED 16 TO 18 MILES

Production will allow this to be sold at a very popular price.

A FEW OF THESE AVAILABLE FOR FLORIDA. Write for full particulars to-day.

#### HACKER STOCK PLANS:

Special Plans Will be Made to Your Order by John L. Hacker—N. A., for Any High Class Job up to 60 Foot. Please Write Your Requirement.

#### HACKER BOAT CO.

Detroit & Mt. Clemens, Mich.

Office: 323 Crane Ave., Detroit

#### G.H.MASTEN CO., Inc.

#### Marine Supplies Dealers and Manufacturers

WICKER Furniture of every description for the yacht or for the home. We can furnish anything, either from stock or to your order.



#### Masten's Jacket Type Over-Seas Life Preservers

are approved by the Steam Boat Inspection Service. They carry the Masten Guarantee of service and satisfaction.





#### Masten's River and Harbor Type Life Preservers

Approved by the Steam Boat Inspection Service are the best that can be produced. Economical in cost, they outlast any in the market.

Visit our display show room. If it's for the marine field, we carry it. Motor boats, Motor boats, Motor soats, ar in e Accessories and supplies

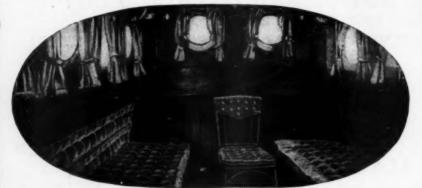


New York Agents for Vulcan Marine Engines and Caille Perfection Motors



#### Life Preserver Cushions

In standard sizes or made to your order. Decorative and useful for cabin or cockpit.





Send for your copy of our catalogue today.





# Universal MARINE MOTOR

### Dependable as the Tide

Specialization in building one type of marine motor has developed unusual skill in every department of production. The Universal 9-12 H.P. motor has long been recognized all over the world as a reliable power plant for boats of any type up to 30 ft. Its smooth, masterful delivery of power has made it the chosen favorite of experienced boatmen.

The Universal has been so perfected as to become a standard type. There are no costly yearly changes of models to needlessly increase the price of the Universal motor.

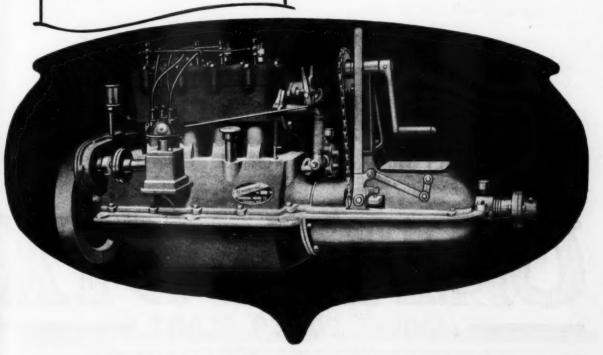
The Universal 4 K.W. Generating Set furnishes steady, flickerless electric light and is as popular as the Universal Motor. It is widely used for lighting boats and boathouses, summer camps and homes.

Write for the Universal Catalog.

UNIVERSAL MOTOR CO.

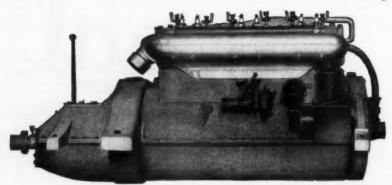
Oshkosh

Wisconsin



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#### The Secret of Smooth, Silent, Steady Power



Lewis "Ultra-Six" Marine Power Plant—for Fast Runabouts and Light Cruisers from 18 to 35 feet. Bore  $3\frac{1}{2}$ ". Stroke 5". 25-30 H.P. Four cycle type. Compact enough to replace most four-cylinder engines.

### SIX versus FOUR

YOU never hear the automobilists argue as to which is the most desirable power—six or four cylinder engines. They all agree that the "SIX" is there with quiet, smooth operation,—with that full-chested, even-flowing power that is practically vibrationless.

The Lewis "ULTRA-SIX" will quickly convince any boat owner that such superlative smoothness cannot be secured in any engine of less than six cylinders. The lighter, faster impulses of the six cylinders overlap one another and blend together into a flowing stream of power that seems to drive your boat without effort. The freedom from strain and vibration is easier on the engine, the boat and the operator.

This is the most complete power plant of them all—the last word in marine motor engineering. Every essential to completeness is built into the Lewis at the factory—electric starter, generator, reverse gear, never-failing oiling system, hot spot manifold, etc., are built-in features that have made the Lewis "Ultra-Six" famous. And—because it is made on a quantity production basis, the price is right.

Don't fail to read our catalog before you decide on your motor. Write for a copy today.

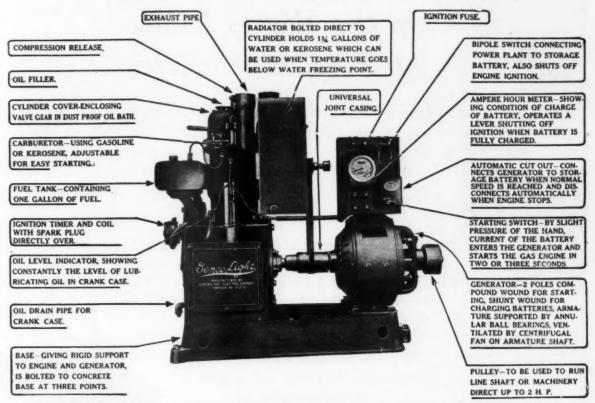
#### LEWIS MOTOR MANUFACTURING CO.

225 S. Main Street

Fostoria, Ohio

# COLUMNE POWER PLANT

# Be Sure to See the **GencoLight** Marine Lighting Plant at the Motor Boat Show



PLENTY of electric current for lighting, heat and power is one of the first essentials for the modern cruiser, yacht, houseboat and work boat. No boat can be considered up-to-date or completely equipped for comfort, convenience and pleasure unless it has an ample supply of electricity for illumination, running lights, and searchlight,—electric power for fans, bilge pump, water supply system and radio set,— and electrical heat for toasters, percolators, chafing dishes, etc. This requires a complete independent electric plant, not connected with the main engines of the boat.

Genco-Light is the most practical electric generating system for real boats. It is complete and self-contained, including a powerful self-starting gasoline-kerosene engine, electric generator, storage battery, ampere hour meter and automatic cut-out. It is built in 32 and 110-volt sizes up to 6 KW, suitable for any size or type of boat up to the largest.

The more you know about the fine points of electrical construction, the more will you appreciate the mechanical and electric superiority of the Genco-Light plant. It is built especially for marine use and is now giving complete satisfaction in service on many pleasure and commercial boats, in seashore and summer houses, lumber and logging camps, etc.

If you miss the Motor Boat Show and the Genco-Light exhibit, don't fail to write for catalog and prices today.

Live Dealers and Agents Wanted—Liberal Proposition

GENERAL GAS-ELECTRIC CO., Manufacturers

#### DEAN ENGINEERING COMPANY

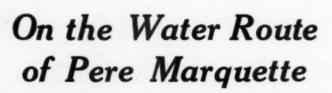
Marine Distributors for Genco-Light

P. O. Box 863

417 William Street

Norfolk, Va.

Agents for Marine and Stationary Gasoline and Oil Engines



Down the long miles of inland waterways, where Pere Marquette's redskins laboriously paddled his birch canoe on its mission of Christianity, countless small craft now speed tirelessly driven by purring Evinrudes.

Wherever navigable water flows you will find the Evinrude. It has brought fishing and hunting grounds within easy reach of sportsmen and has made waterways the playground of nations.

Magneto, built-in-flywheel type, and Automatic Reverse are standard Evinrude features

The leading sporting goods or hardware stores in most localities sell the Evinrude.

Catalog on request.

#### EVINRUDE MOTOR CO.

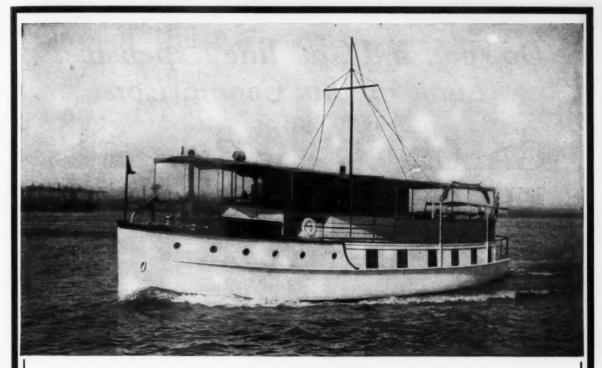
340 Evinrude Bldg.

Milwaukee, Wis.

#### Distributors:

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  214 State Street - - Boston, Mass.
- 440 Market Street - - San Francisco, Cal.
- 211 Morrison Street - - Portland, Ore.

**EVINRUDE** 



### A Signal Achievement

THE 61-ft. HOUSEBOAT

Wide-spread attention greets this newest product of the Mathis yards. A matter of minutes for a momentary size-up—then enthusiastic approval breaks. For this 61-footer is a master combination of our 80-ft. and 52-ft. houseboats of last year, with every advantage of the former retained with

#### Lower Operating Cost

as in the smaller boat.

A saving of the sterling, approved advantages of each—a culmination of the finest features born of years of experience in houseboat planning and building.

Note the trim yachtiness of all her lines in photograph above. 16 feet in beam, this boat

#### Draws but 42 Inches of Water

-able to go anywhere, in shallow, tortuous inland streams.

She is equipped with enclosed steering stands; has a large, roomy deckhouse and large after-deck.

We have never turned out a more seaworthy model. Powered with a six-cylinder, 70-90 H.P. Standard Engine, this boat is able to make between 11 and 12 miles per hour.

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CAMDEN, N. J.

We are now building a new 85-foot boat which embraces the very latest ideas in houseboat development and which will compare in comfort with any 120-foot cruiser afloat.

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Cut shows installation on a 2-cylinder Scripps Marine engine.

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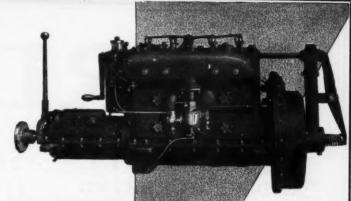
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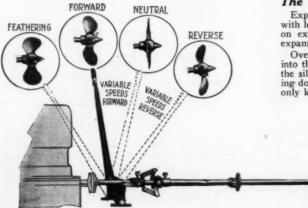
The Gordon is lighter and simpler than any reverse gear. There are fewer working parts to wear or get out of order. It takes practically no room in the boat, a most important feature in many craft. It is easily controlled, from full speed forward to full speed reverse without throttling or racing the engine. A child can understand and operate it.

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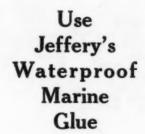
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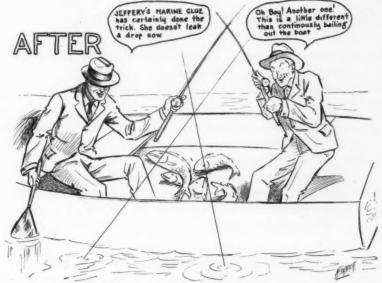
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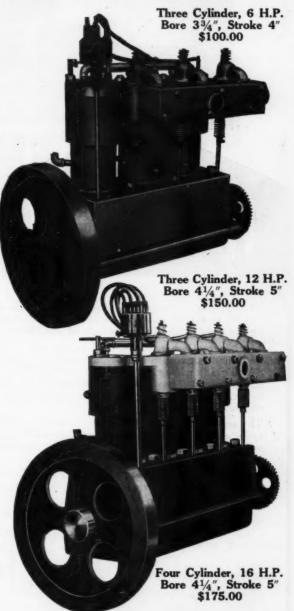
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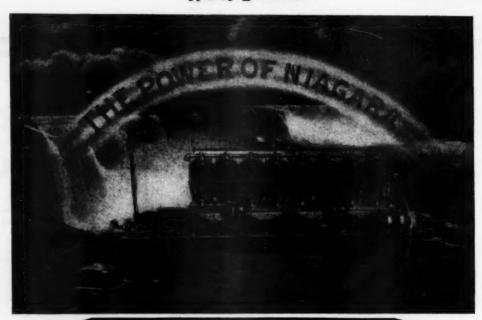
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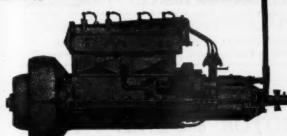
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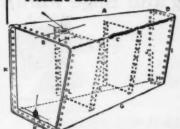
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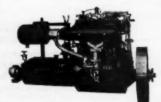
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-FOUR CYCLE-MARINE ENGINES

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REGALITE-the new Electric Lighting Plant, 2 h.p. air cooled motor, 1/4 k.w. generator. Write for information.

# REGAL GASOLINE ENGINE CO.

74 West Pearl Street

COLDWATER, MICH.

## What 1920 Has Taught Us

(Continued from page 12)

(Continued from page 12)
included some five boats from Philadelphia and others from other sections of the country. Victory II's margin of win from several other boats was very small.

As a general rule, the existing racing formulae and handicap rules have given excellent satisfaction. Of course there have been complaints on some sides, but these generally come from poor losers or have been due to a condition which is beyond the scope of any racing rule or a condition over which the local committee has no control. In some instances, results of our handicapping rules have not been as close as desired, but these have generally been caused by fog or other unfavorable weather conditions or due to the fact that the local committees chose a time for the races which provided unequal tidal con-

weather conditions or due to the fact that the local committees chose a time for the races which provided unequal tidal conditions to all boats. Quite naturally, no handicapping rule can be devised to meet these conditions.

In a few instances, complaints have been made against the handicapping rules by a certain class of boat owners who have not been able to win according to the existing rules. These boats have been of a very inefficient type. The fundamental principle of any handicapping rule must provide that the best combination of power plant and hull shall win. It does not even assume, as is sometimes thought by many racing men, that theoretically all boats should finish together. The fundamental is that the best boat shall win and the results of the past season have proved the soundness of this fundamental in the rules.

The question of revolutions of the engine and the statement by the owner of the revolutions of his engine is the one feature which always leads to the greatest trouble with the racing rules. However, it is a fact that revolutions of the motor must be used to determine its horsepower. Should we go back to the old rule which was used a few years ago of disregarding revolutions in determining horsepower, we would be doing a great

lutions in determining horsepower, we would be doing a great injustice, and in many ways hampering the development of marine engines. This condition led the American Power-Boat Association at its recent annual meeting in New York City to adopt the following rules for determining revolutions of the

The local Race Committee may determine which one of the following methods determining "R" (revolutions per minute of the motor) is to be used and may specify same

minute of the motor) is to be used and may specify same in circular of conditions.

A—When a boat is being measured, the owner shall furnish the measurer with a signed statement giving the r.p.m. of the engine. If it is found later that the actual revolutions per minute of the engine have exceeded this in a race, the owner may be disqualified as to that race by the local Race Committee. The local Race Committee shall use its discretion in this matter, as no rule can be devised capable of meeting all conditions.

B—When a boat is being measured the measurer shall determine the revolutions by an actual trial under the conditions which, as nearly as possible, correspond to actual racing conditions. In the determining of the revolutions by this method, the owner or his representative must cooperate with the measurer in every possible way by putting

operate with the measurer in every possible way by putting boat at the measurer's disposal and complying with the measurer's instructions. It shall be the duty of the owner

measurer's instructions. It shall be the duty of the owner to see to it that the motor is run at its maximum speed during the trials. Should it be found later that the actual revolutions in a race exceed those in the measurer's trials, due to a condition under the control of the owner or crew at the time of the trials or in a race, the owner may be subject to disqualification as mentioned in Paragraph A above.

C—When a boat is being measured, the owner shall furnish the measurer with a signed statement giving the r.p.m. of the engine. The local Race Committee shall then request each owner to name an observer to take the actual revolutions of the motor during the race. In case no observer is named by any owner, the local committee shall name one for that owner. The local committee shall place these observers on the boats during the race, determining by lot (Continued on page 184)

# Fog Robbed of Its Terror

(Continued from page 19)

of fog per year for the last few years. Slightly more than two and one-half hours per day the year around. The shipping entering and leaving New York Harbor alone during the calendar year 1919 aggregated 9,186 vessels with a tonnage of 27,640,925. While the assumption that each of these vessels was delayed by fog will not hold, it is probably true that the average delay to each will run into an hour or more. The cost of this delay when translated into dollars will be stupendous. When the figures for the entire United States are considered we see that 79,026 steam vessels with a total tonnage of 95,546,540 entered and cleared from harbors of the (Continued on page 192)

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# **GIBBS QUALITY**

Just a portion of our facilities for boat building, overhauling and repairing are shown in the view above. Notice the various types of boats under construction, and note particularly the new 1200 ton floating dry dock at the right. It is 156 ft. long on the keel blocks and 52 feet between wing walls.

Anything from a little power tender to a good sized coaster, yacht or commercial boat is within our range. We are equipped to perform every operation within our own plant.

Machine shop, joiner shop, paint shop, blacksmith shop, dry dock, marine railway, complete stocks of lumber and other materials, plenty of room, all manned by skilled workmen and directed by experienced boat builders—these are the facilities offered by this company.

Let us tell you some of the advantages of having your boat built or overhauled here in Florida.

# **BUILDING — OVERHAULING — REPAIRING**

Runabouts, Cruisers, Houseboats, Commercial Boats

Estimates on any work furnished on request.

# GIBBS GAS ENGINE COMPANY

JACKSONVILLE, FLORIDA

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#### Motor Boats Now Factor in Fishing Industry

Industry

(Continued from page 29)

duced food supply valued at \$1,765,351, as compared with \$1,171-259 for the year ending June 30, 1917, or an increase of \$594,092 in the two years. Motor boats handled virtually all this freshwater fish production, though the greater part of the 11,050,253 pounds of catfish, valued at \$994,522, taken last year—the largest and most valuable part of the fresh-water fishing industry in the State—was taken by rowboat, but immediately transferred to motor boat for shipment to market or to railroad centers.

The 4,095 motor boats, which the Louisiana State Department of Conservation estimates as engaged in the fresh-water fisheries of the State are valued by this department at \$921,375, while the 85 motor craft engaged in transferring the catches to market are valued by the same authority at \$170,000. Some idea of the use of rowboats in this industry may be gained from the fact that there were 950 working in it on April 1, 1920, valued at \$28,500. The total number of boats of all kinds in the fresh-water fisheries of Louisiana is placed at 5,130, of a value of \$1,119,875, out of a total value of properties, land, packing plants, icing plants, seines, etc., of \$2,128,665. The total of fishermen and shoremen is estimated at 3,340 and the total of persons supported by the industry at 25,000. Without motor boats it could hardly exist, owing to the distance from market of the best fishing grounds; certainly, without power in the bioats, the amount of fish transported to market in a salable condition would not be one-tenth of the present output.

(Continued on page 188) would not be one-tenth of the present output.
(Continued on page 188)

## For Fishing in Florida

(Continued from page 30)

Miami last year to make a personal survey of the requirements of the Florida fishermen. The results of his contact there must, therefore, be represented in this new design— Let us examine it. First of all, it is more than a Florida fishing boat, it is more of a Florida cruiser, combined with all facilities for angling for the game fish of the South. Its length over all is 36 feet 6 inches, with a beam of 9 feet and a draft of 2 feet 6 inches. Under trunk cabin with full head room, two berths are arranged forward forming owner's quarters with entrances to inches. Under trunk cabin with full head room, two berths are arranged forward forming owner's quarters with entrances to lockers and toilet room. The engine compartment follows where two six cylinder motors are installed. Ice-box and galley equipment is arranged at the forward end of this compartment. A portable brass rail running fore and aft in front of each motor forms an attractive passage through the combined engine room and galley. Steps up lead to self bailing cockpit which measures II feet where two swivel chairs are arranged with bait well sunken in deck forward. The boat is controlled from measures II feet where two swivel chairs are arranged with bait well sunken in deck forward. The boat is controlled from the forward end of cockpit where steering wheel and engine controls are located. A khaki awning is arranged over cockpit, the after section of which telescopes forward to allow free use of the rod while trolling or still fishing. A very practical and simple method of disposing of the awning objection on many fishing boats. A guard railing is arranged on the forward deck for harpooning. This sport in Florida waters is considered by many as more thrilling than a fight with a big amber jack or tarpon, and adequate means must, naturally, be provided.

(Continued on page 188)

# The Venice of the East

The Venice of the East

(Continued from page 32)

into kerosene motors. The vaporizer used is a local invention, the chief points of which are two floats, one for petrol and one for kerosene. There is a change-over valve, so that when the petrol is used the gas does not pass through the hot vaporizer for kerosene. The vaporizer is constructed in such a way that when short of petrol for starting, a blow lamp or failing that a rag steeped in kerosene will heat the vaporizer sufficiently to start the motor on kerosene. The heating of the vaporizer by the exhaust is automatically controlled. When the motor is going full power the regulator prevents the over heating of the vaporizer so that the kerosene is not cracked. When going slow more heat is brought to bear on the vaporizer, one part of which is filled with aluminum filings, which when once heated retains the latent heat for a long time, especially useful for going slow on kerosene for some length of time, and this is often the case here where our canals are crowded with traffic. The last and most important part of this vaporizer is the extra-cold-air-valve, which is both automatic and regulated by hand. This extra-cold-air-valve is placed as close to the (Continued on page 188)

The Way We Would Do It

# The Way We Would Do It

(Continued from page 39)
have sufficient to form two lengths longer than the boat. A door can be arranged to enclose the ends as shown on our sketches and the entire construction of a simple shed is plainly apparent from a little study of the drawings. st he to

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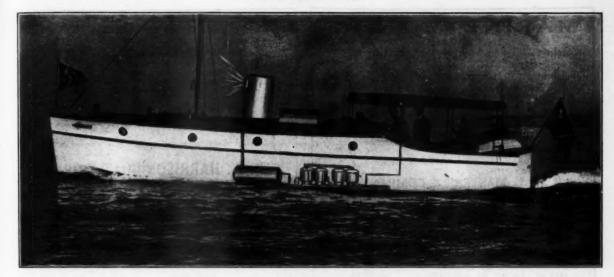
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# NAVIGATION LAWS DEMAND A WHISTLE

# Why Use An Auto Horn?

The first real whistle outfit ever built expressly for your boat.

The whistle can be operated at anchor, as well as under way, by means of air storage.

The best that can be produced and complete in every detail.

Standard Equipment

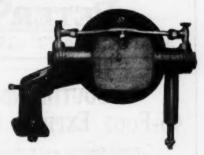
MODEL A

MODEL B

Compressor—1" bore, 11/2" stroke, Compressor—Same as Model A 2 cylinder opposed

Safety valve
Tank—8" x 18"
Gauge and whistle
Tubing—12'

Tank—12" x 24"
Gauge and whistle—larger
Tubing—20'



General Air Compressor, is friction driven, running in contact with the fly wheel of the engine, delivering an abundance of air to storage tank. Used in connection with General Navication. Whistle.



(1) The Lightning Cut (2) The Wandering Oil Groove

# GENERAL LIGHTNING CUT PISTON RINGS

will absolutely give you equa-radial pressure on your cylinder wall, obviate the loss of compression, and maintain the roundness of your cylinder.

The Wandering Oil Groove not only lubricates the cylinder wall, but effectively lubricates the ring itself, retaining the resiliency of the metal and avoiding friction.

General Lightning Cut Rings are guaranteed to give the best possible results. Properly fitted and used, they will effect economy in many ways. (Write us for further information.)

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Write for our latest list of rebuilt engines, telling approxi-mately the type and power you require or the details of your boat. Engines are thoroughly overhauled and rebuilt by our marine engine experts.

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One simple operation for adjustment.
Guaranteed accuracy to one-quarter
thousandths of an inch.
Can be operated without removing shaft
from engine.
A Peters' Crankshaft Grinder will true
sgg-shaped crank pins in one-fifth the
time ordinarily required by any other
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Price, \$75.00.
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Length - -

- 10' 6" Power 8 cyl. FM. STERLING Beam

Draft

SOUTHLAND STEAMSHIP CO.

Shipbuilding Dept.

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# THREE B

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mean the use of quality materials by quality workmen in the producing of quality products. HARLEY QUALITY means everything the words imply—yet HARLEY prices will materest

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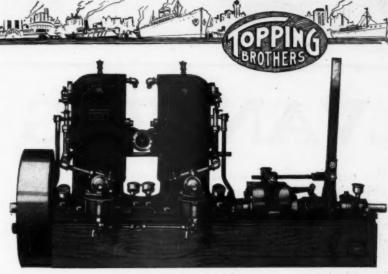
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Size "G"-Bore 49/16"-Stroke 5"

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class for twenty
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supreme in
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Barker Motors in all sizes will be displayed at the Motor Boat Show by Topping Brothers in spaces 46-48, Mezzanine Floor.

Also see small sizes in famous TOPPAN DORY and yacht tender in space B-4 on Main

Four sizes single cylinder. One size with two cylinders.

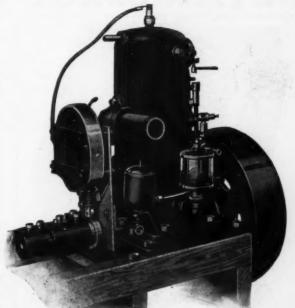
The Barker "Red Letter Book" tells more about this sturdy, reliable engine. Write the factory for Free Copy.

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THE BARKER FACTORY
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"THE WORLD'S NAVIES"

are sailed by Spirit (alcohol) Compasses. Why? Because they are best by actual test.

STAR COMPASSES are spirit (alcohol) compasses, based on principles over one-half century standing, backed by more than forty years experience.

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Our trade mark on every compass protects you; insist on seeing it.

There's a size and style to meet your need. Our pamphlet, "COMPASS POINTS," mailed on request, will give you much valuable information on the compass.

NEW YORK



# Water Soaked Shaftlogs Decrease Motor Boat's Power

Our metal adjustable shaftlog is placed inside the hull, using rubber gasket; stuffing box is also supplied with rubber gasket, thereby insuring a perfectly watertight installation; is easily adjustable to any angle desired. Easily installed in new or old boats.



The only shaftlog constructed to carry a sleeve which prevents moss or weeds from wrapping around shaft stalling the engine. The many advantages together with the low price is making this log very popular.

#### Made in Five Sizes

No. 1 Maximum Bore 5\%" No. 3 Maximum Bore 1\%\%"
No. 2 Maximum Bore 1" No. 3A Maximum Bore \frac{1}\%"
No. 4 Maximum Bore 2"

Made in Grey Iron, Bronze or Aluminum.

These logs are furnished complete with housing, stuffing box and gaskets at the above prices.

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If equipped with our double grip clutch couplings

A combination coupling and one-way clutch connects the engine and propeller shaft as firmly as a sleeve or flanged coupling, requires no foundation, easily installed, requires small space. Made of close grained grey iron, will last longer than engine.

This clutch stands paramount among motor boat accessories and is making large and increasing sales daily because of its many advantages and low price. Send diameter of engine and propeller shaft and width of keyways. Made in six sizes.







| No. | Diam.   | Wt.     | Max.<br>Bore | H. P. Per<br>100 Revol. | Max. Size<br>Propeller |
|-----|---------|---------|--------------|-------------------------|------------------------|
| 1   | 4 in.   | 5 Lbs.  | 1 in.        | 11/4                    | 11 in.                 |
| 1-4 | A 5 in. | 12 Lbs. | 1½ in.       | 2                       | 13 in.                 |
| 2   | 6 in.   | 14 Lbs. | 1½ in.       | 31/2                    | 15 in.                 |
| 3   | 9 in.   | 25 Lbs. | 2 in.        | 103/4                   | 20 in.                 |
| 4   | 12 in.  | 45 Lbs. | 21/4 in.     | 23                      | 28 in.                 |
| 5   | 15 in.  | 90 Lbs. | 31/4 in.     | 46                      | 36 in.                 |

The prices on the above are lower than are offered on any other equipment for the same purposes. Send inquiries to Topping Brothers.

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SHIP CAULKERS' TOOLS

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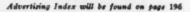
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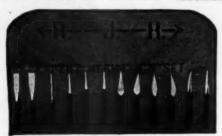


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The HARROLD TOOL & FORGE CO. Stand Behind All Tools of Their Manufacture

Illustration Below Shows the "HARROLD" MECHANICS' SET

Made from high-grade, warranted tool steel, polished head, blade or taper baked ebony stock.



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# HAVE STOOD THE ACID TEST OF LONG SERVICE

Harthan Propellers installed years ago are giving constant service today. Their reputation has been earned by their ability to withstand punishment that many other wheels were unable to endure.

Harthan Propellers are correctly designed on the true screw principle. The special bronze composition of which they are made is extremely tough, permitting thin blades with sharp edges.

Order a Harthan Propeller for your boat and you will get the highest efficiency from your engine power.

Superiority of Design Durability of Materials

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Accuracy of Manufacture Excellence of Finish

Made in sizes from 10" to 30" in two blade, and 10" to 50" in three blade.

We will be glad to recommend the correct size and pitch for your boat if you will send us the details of boat and power.

McFARLAND FOUNDRY & MACHINE CO., TRENTON, N. J.



NEW YORK

Advertising Index will be found on page 196

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FOR THE SMALLEST YACHT
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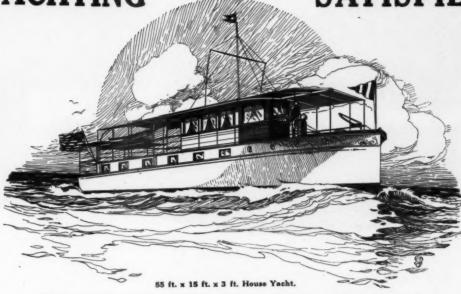
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This will be a big yachting year; why not enjoy the wonderful comfort of a houseboat? Economical in operation. A boat on which guests, owner and crew are all

# SATISFIED

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Two 85 ft. House Yachts are now in commission, and two 73 ft. House Yachts will be ready for early delivery. Write or phone for complete specifications.

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Built in sizes:

2-Cyl....15-20 H.P. 4-Cyl....40-50 H.P. 6-Cyl....65-75 H.P. All 6 ½ " Bore x 8 ½ "

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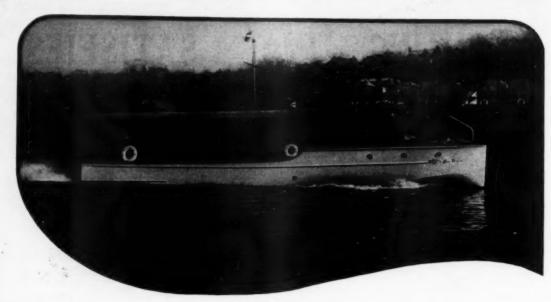


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BUILDERS 

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ORIANA II

# A Yacht for a man who knows boats

Mr. A. T. Murray, President of the American Bosch Magneto Corporation, selected The New York Yacht, Launch and Engine Company to build his newest boat.

Oriana II is 53 feet long, 12 feet 6 inches beam and 3 feet 3 inches draft.

Complete in every detail, she is one of the many craft built by us which have made our products known wherever boats are used.

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If you want a boat that is a little better than you can have built elsewhere you'll come to us.

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Located on a railroad as well as on the waterfront we enjoy facilities that few yards can claim.

An unbroken record of 19 years of satisfactory service and fair treatment to our customers, and our desire to work with them as well as for them, has made us many friends.

We are also builders of the well known 20th Century heavy duty motors. Two, four and six cylinders, 15 to 75 H.P.

If you are interested in real boats for real service, pleasure or commercial, large or small, we invite your inquiry.

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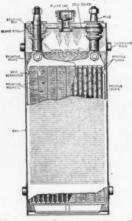
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# Is Your Electric Equipment Satisfactory?

If not Edison Batteries will make them so



Note delicate instrument in same room with batteries. No corrosive fumes from Edison Batteries.



Note rugged construction of cells. No delicate ribbon or glass jars to break.



Note special battery for small boat ignition and lighting. No freezing in winter.

New York Yacht Launch and Engine Company as well as all other leading yacht builders use Edison Batteries as standard equipment.

Never before heard of. A real direct connected plant suitable for the smallest boat and weighing less than 100 lbs.

See the newest system for lighting your boat at our Booth No. 30-31.

Can be furnished in all voltages from 6 to 8—12 to 15—28 to 32, with a capacity up to 40 amperes. Changes can be made in a few minutes and at hardly any expense to change to any desired voltage in this range.

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Electrical Engineers and Specialists

ON MARINE EQUIPMENT OF ALL KINDS SEARCHLIGHTS, FIXTURES, SWITCHBOARDS

Winton 5 & 71/2 K-W Generating Sets Matthews 1 & 2 K-W Generating Sets

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The New York Yacht, Launch and Engine Company is one of the many well known boat builders who have demonstrated the success of this selection.

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A most beautiful flat white finish. Easily scrubbed to remove all dirt. Leaves surface in smooth condition for repainting, without the need of burning or scraping. Will not blister, crack, or peel.

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For bottoms of wooden vessels. Absolutely the best preservative against barnacles, worms, grass and all marine growth. Particularly efficient in tropical waters.

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"Made to Walk On"
MARINE BLACK and MARINE HIGH GLOSS BLACK

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# THE DEBEVOISE COMPANY PAINT MAKERS

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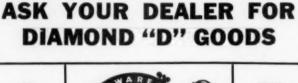


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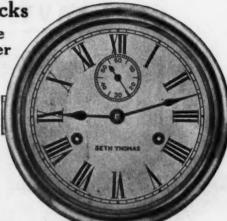


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Marine Clocks
There Are
None Better





Illustrations represent some of the patterns that the U. S. Navy and U. S. Shipping Board used thousands of during the war.



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Mahogany Cabinet Case.
High Grade 7 jeweled Lever
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4-inch Porcelain Dial
Height, 8 inches.



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8-Day Ship's Bell Strike Movement
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Bronze Case, High Grade
7 jeweled 8-Day Lever
Ship's Bell Strike Movement.
6-inch Silvered Dial with
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LEISSNER SYSTEM
60 H.P. Four Cylinder Mianus Heavy Oil Engine. Made in sizes of 73/2 H.P. up.

THE successful oil engine of popular size is at last an accomplished fact. With its practical value proved by more than a year of general sale and operation in many types of boats, preceded by many years of engineering study and tests, there is no question that the Mianus Heavy Oil Engine is not only all we claim it to be but also it is all that the boat owner has hoped for in the way of an economical, durable and trouble proof power plant.

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Instead of the explosive power impulse of gasoline, the heavy oil burns with a slow, steady expansion that lasts throughout the power stroke and makes the engine as quiet, smooth and vibrationless as a steam engine. Flexible control is secured by governing the amount of fuel, the fuel consumption always being in exact proportion to the power developed.

The Mianus eliminates all carburetors, magnetos, batteries, ignition appliances and starting devices used on gasoline engines. It does away with all hot heads, electrical starting plugs and heaters, torches, etc., used on other oil engines.

The fuel is injected without any complicated air compressor, the weakest point in most Diesels. The ignition is accomplished by the heat of high compression. Any fuel from kerosene to the heaviest crude or fuel oil may be used. The combustion is so complete and perfect that there is no necessity for removing carbon. Every moving part is lubricated by the force feed oiling system.

# For Cruisers, Auxiliaries and Commercial Boats

Tell us what it costs to run your boat with your present engine and we can tell you how much it will cost with a Mianus, and how quickly the Mianus will pay for itself in money saved. Don't decide on any engine until you have this information.

See Us at the New York Motor Boat Show

# THE MIANUS MORKS, Stamford, Conn., L. S. A.

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You can go anywhere in a Disappearing Propeller Boat

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The moment the pertecting sleep comes in contact with a submerged rock or log at a and bar, etc., the propeller autonatically moves up into the well (see illustration below) and he engine throttles down. When you beach the boat, you seed never worst about the propeller.

The propeller a life on stabilizes the boat like a centerboard. The sames have completely enclosed keeps the boat class. An ideal bear to discount while bothing: it won't tip and codange-other occurants.



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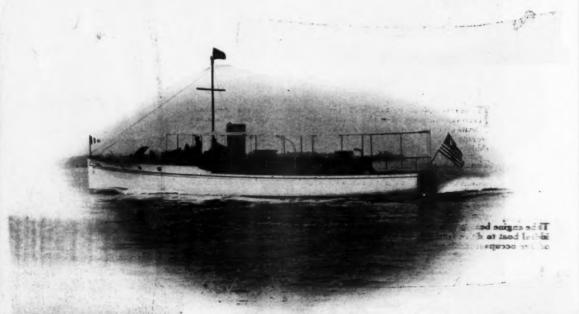
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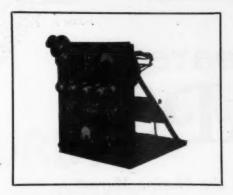
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# "Radiophone" Apparatus

(Wireless Telephone and Telegraph)

# for Yachts and Motor Boats



# DeForest Oscillion Transmitter Type O T-10 for Yachts and Motor Boats

SAME Transmitter used for both Telephone and Telegraph. Instantly changed over. Small, compact, requires little space. Receiving apparatus equally compact and highly efficient. Receives spoken words or dots and dashes with equal facility. Will receive all local and large, remote stations, including the trans-atlantic stations. Easy to operate, requires no delicate adjustments. The "Radiophone" is the most modern, most satisfactory and quickest means of communication for Yachts, Motor Boats and ships of any size. Get the full information at once.

THIS new DeForest "Radiophone" development provides instant, word-of-mouth communication between moving or stationary boats, or between boats and shore stations. It is thoroughly practical and reliable, and has been tested and proven repeatedly. A large number are now in satisfactory use.

#### Continuous, Sustained and Reliable Telephone Service over Distances up to 30 Miles

With possible service of from 500 to 1,500 miles depending on conditions of installation and transmission. The same apparatus may be used for Wireless Telegraph communication with positive service over distances from 100 to 150 miles.

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No changes in connections required; throw a switch and talk, throw it back and telegraph. There are no intricate or difficult adjustments; no wireless experience required. Anybody can use the "Radiophone" as easily as the ordinary telephone. Perfect voice quality; clear and distinct.

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Every boat owner should learn about this newest development in the Radio field. Don't wig-wag your messages, or go ashore with them. Telephone them with the "Radiophone". Tell us heighth of mast, length of boat and the nature of your lighting circuit and get full information, with approximate costs for installation.

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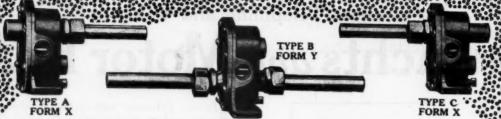
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# PUMPS

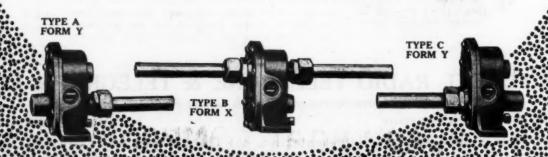
The Most Popular Pumps on the Marine Market for Water, Oil or Fuel

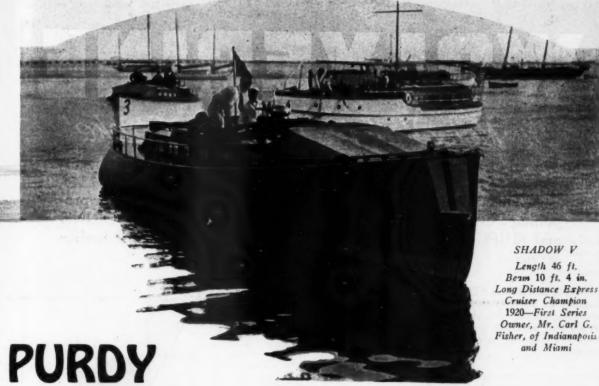
The finest power plant made will not operate properly if it is equipped with an inferior pump, whether it supplies water, fuel or oil.

#### OBERDORFER BRONZE GEARED PUMPS

are built especially for marine use—they are made to withstand the hard service encountered in use on board boat—Oberdorfer Bronze Geaved Pumps are noiseless, automatic, compact and reliable. The supply of water, fuel or oil is governed entirely by the motor—there is never an over or under supply. If you have ever had trouble with your pump you will find a world of satisfaction in the trouble-proof Oberdorfer. If you own a boat powered with an internal combustion engine you will be interested in our new book on pumps. Your copy is ready for you—it comes free on your request.

M. L. OBERDORFER BRASS CO., 812 E. Water St., Syracuse, New York





BOATS

Purpy built boats have gained a position in the very front rank of the express cruiser class. Not "how many" but "how good" is the standard by which the success of the Purpy production is judged.

THE PURDY Boat Company offers complete facilities for the designing and building of a limited number of superior quality express cruisers. We believe that by confining our efforts to a few boats of this class, we can give the owner the personal attention to every detail which is unavoidably lacking in a larger production.

MISS MIAMI. Mr. Fisher's entry for the next Fisher Trophy Races is PURDY built.



Length 42 ft. Beam 9 ft.
Runner up—Long Distance Express Cruiser
Championship
1920—Second Series
Owner, Mr. Arthur C. Newby, Indianapolis

# **PURDY BOAT COMPANY**

Trenton

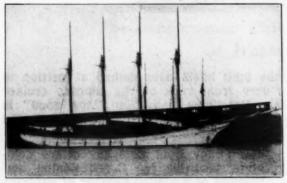
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Michigan, U. S. A.

# "The Motor With the Bore and Stroke"

This type of engine is especially adapted for boats used for propelling POWER LIGHTERS, boats equipped for STEVEDORING and SHIPCHANDLERY work, TOW BOATS and general harbor service.

Ample BORE and STROKE enable "Wolverine" Engines to develop their full rated power at low operating speed. Big sturdy parts, the best of materials and excellent workmanship enable them to maintain their full rated power for the life of the engine.



Canadian Schooner "BESSIE A. WHITE," loaded with 650,000 feet of spruce lumber. 187 feet O.A. by 37 feet beam by 13 feet draft. 200 B.H.P. "WOLVERINE" Engine using PRODUCER GAS fuel.



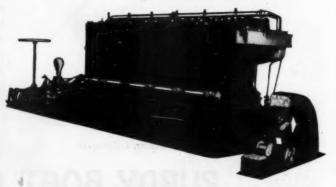
Stevedore Lighter "ELSIE" operating in New York harbor.
65 feet O.A. x 18 feet beam by 4 feet 10 inches maximum draft.
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SIZES: 5 H.P. to 200 H.P. 1 to 6 cylinders.

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(Formerly at Grand Rapids, Michigan. Established, 1894)

# There Are Two Sides to Every Story

Interesting Letters Received by the Editor Which Give Readers' Views on Important Subjects of the Day

#### Are All Motor Boatmen Landlubbers? Motor Boat Sportsmanship and the Inventor of

O much drool has been fed to motor boatmen by your-Self and myself and other worthy editors, present and past, that they are full of pride. They think they

Occasionally they are criticized in the boating magazines, but then only indirectly. They are told that others anchor in two fathoms with three fathoms of rode, or that novices go astern with fifteen feet of boat painter dangling under their counters. But they are never caught up with the direct assertion that they do these things themselves. With your permission I should like to reverse the reel and tell your readers what I think of them. Is permission granted? Very well, quartermaster, spell this out in International Code—I think they are a crew, or a flotilla, or a herd of buoy-riding, paint-rubbing landlubbers.

Now I shouldn't like to be misunderstood on this important matter. I don't characterize your estimable readers as spray-dodging, veranda-loving landlubbers because they call a fender a bumper or because they moor a boat to a float with a lover's knot. The trouble is much more sub-cutaneous than that. I think they are a flock of hayseed sailors because they are afraid to go farther than swimming distance from their home ports. I devoutly believe that the only bluewater sailormen of the genus gasoline are the Atlantic coast fishermen. They go out to the banks when your readers and myself are caulking off eighty to the minute, their little putt-putts four-cycling until the priming has worked out of the cylinders and then barking out clear as a machine gun; and they do a day's work before we roll over and wonder whether the sun's going to be too hot to continue our cruise up the back river. The fishermen are regular motor boatmen, and I hasten to exclude them from my arraignment.

When I said above that your readers are afraid to put out from their home ports I didn't mean that as literally as it sounds, because I know that they do leave their buoys on the great and glorious occasion of the annual fleet cruise. If their home port is Padanaram they venture right out into Buzzards Bay and sail all the way across the Atlantic! Why, anyone can tell you that it gets awfully rough in the Atlantic. And in the afternoon, about four hours before sundown, they sail home again, and those who forgot to take on gas or who ate too much lobster at Oak Bluffs are towed along by obliging friends.

Or-I don't want to seem personal in my remarks-if they fly one of the thousand-odd flags of Boston Harbor, they creep out around Allerton and down past Minot's, where in the winter the sea sometimes breaks right over the lighthouse, and through Cape Cod Bay and the canal, and have their rendezvous in Mattapoisett Harbor, which is an ideal anchorage because it is exposed to practically every breeze except the one that blows the mosquitoes away. And the maim and the halt and the spray-blinded find the dolphins in Cape Cod Canal tremendously conveni-

ent hitching posts for their decrepit steeds.

I haven't anything against the Massachusetts sailormen in particular. It is my belief that right down in Long Island Sound you have some of the gamest boatmen afloat. every year they sail a long distance race to Stratford Shoal and return. And return, mind you. It isn't enough punishment to run away down to the middle of Long Island Sound and look for the lighthouse. They turn around after getting there and sail all the way home again. How in Heaven's name your local talent has the nerve to do all this in one day is beyond my comprehension. Once I almost took part in the Stratford Shoal race. In the capacity of deckhand I boarded as seaworthy a 36-foot cruiser as you ever saw, and when we had won our way through Hell Gate and out to Lloyd's Neck, her doughty skipper thought of the risk (Continued on page 186)

the Hydroplane

THE American Power-Boat Association represents American sportsmanship in the world's champion-ship races, in which great advances in speed are being made from year to year through the invention of the hydroplane and the creation of a new art in marine engineering, which is in its infancy and in the process of revolutionizing the industry of boats and ships to a greater extent perhaps than naval architects and engineers con-

In the history of the bicycle, the automobile and of power and sailing craft, the racing sport has been the tepping stone in commercializing each one of these in-

In 1905 an American manufacturer and inventor went to Europe to sell some patents and enjoy his first vacation

without having to worry about a business.

By chance, one Sunday in 1906, he saw a Bonnemaison "Ricochet" bobbing along on the Seine, and, making inquiry, was told that it was a hydroplane. Never having heard of a hydroplane and not knowing what such a thing was, it was explained that the "Ricochet" had a step about the middle of its length and the bottom of the box-shaped hull formed two flat planes, the front one terminating in a toboggan-bow, which I discovered some years later, was an exact reproduction of the Ramus design with which W. Froude carried on extensive experiments for the British Admiralty in 1872. But Mr. Froude was such an able expert and authority in the sciences of marine engineering that he demonstrated and, in a measure, proved by the known art that hydroplane craft would have no advantage in speed, and, to use his own words, would be incurably dangerous because of the skipping and pounding action on the water.

Mr. Froude appears to be the first naval architect and engineer to black-ball the hydroplane but the profession has been at it pretty consistently ever since, and I understand the American naval architects are still lying awake nights and using their polytechnic, slide-rule heads to keep

the hydroplane out of the cruiser class.

To go back to the "Ricochet" bobbing along the glasssmooth Seine, I said to my informant, who enlightened me as to what a hydroplane was—"there is a great future in the hydroplane if something can be invented which will

stop that pounding and make a good rough-water boat."
Soon after this I learned that Compte de Lambert had a catamaran pontoon craft with five board planes cross-

wise under the pontoons, but I found that this pounded too. The invention of the Fauber V-planes is a long story of expensive experiments and various important discoveries of a scientific nature which, I hope, at some future time, to put in a book first, because it is history in an art which marks the only new and radical departure from the dis-placement hull of Noah's Ark; second, because, as an inventor and manufacturer who has had a lot of practical experience in commercializing inventions, I may be able to give some of the world's future inventors, and possibly the new school of naval architects, some pointers born of experience.

The making of inventions is a science which the ancients may have respected and inscribed on their tablets of stone, but we are still living in an age only a generation or two from witchcraft; the inventor is a crank, and hide-bound professionalism does not recognize genius until after the inventor is dead. Invention is ground under the heel of pirates and the inventor is meat for America's bigbusiness corporations and millionaire profiteers.

The war cost the United States and Great Britain hundreds of thousands of men and billions of dollars because the world has not yet learned to mobilize and

foster the genius of invention and science.

# **Another New Ideal Book**

# Ready December 10

Volume III of the Ideal Series Twelve Complete V-Bottom Designs

By William H. Hand, Jr.

# Prepared Expressly for MoToR BoatinG

The new book which is now on the press will be the most valuable one ever published for the amateur builder or anyone desiring to have a V-bottom boat built by his own builder.

The plans contain outboard profile, lines, inboard, construction and interior arrangement plans, sectional views and complete table of offsets. Accompanying each design is a description of the boat and a full set of specifications taking up step by step each feature of the boat's constructions, how it should be built and the proper material to use.

Plans and specifications of the following boats are included: Edith, a 15-foot runabout; Jane, an 18-foot runabout; Katherine, a 30-foot cruiser; Dorothy, a 25-foot runabout; Zenith, a 25-foot cruiser; Cyclone, a 36-foot auxiliary; Eclipse, a 40-foot express cruiser; Magnet, a 28-foot cruiser; Tornado, a 45-foot auxiliary schooner; Broncho, a 29-foot cruising runabout; Shark, a 21-foot utility runabout; Claire, a 36-foot express cruiser.

Price of Twelve Complete V-bottom

(If ordered with the 2 other volumes of the Ideal Series, the price of the 3 books will be \$5.00.)

# MOTOR BOATING

New York, N. Y. 119 West 40th Street

# What 1920 Has Taught Us

(Continued from page 154)

as to which boat each observer should be placed on, but so placing them that no observer is on the boat of the owner naming him. It shall be the duty of the observer to owner naming nim. It snail be the duty of the observer to take actual revolutions of the motor during the race with an approved revolution counter at 15-minute intervals or at such intervals as the local race committee may specify, and report this to the local Race Committee immediately after report this to the local Race Committee immediately after the boat finishes. Should it be found that the maximum revolutions so reported exceed those specified by the owner in his signed statement, then the owner may be disqualified as mentioned in Paragraph A.

D—The local Race Committee shall request each owner to name an observer to take the actual revolutions of the motor during the race. In case no observer is named by any owner, the local committee shall name one for that owner. The local committee shall locate these observers on the boats during the race, determining by lot as to which hope each observer shall be placed on but as observed them. on the boats during the race, determining by lot as to which boat each observer shall be placed on, but so placing them that no observer is on the boat of the owner naming him. It shall be the duty of the observer to take actual revolutions of the motor during the race with an approved revolution counter at 15-minute intervals or at such intervals as the local race committee may specify and report same to the local Race Committee immediately after the boat finished. The maximum revolutions so reported shall be used as the basis for calculating the horsepower of the motor mentioned in Section 5-Rule V. (Note) When Method D is employed it will be necessary to calculate the time allowances after the boats have finished.

When no method determining the revolutions is specified by the local committee, the method mentioned in Paragraph A shall be used.

In any particular race, the same method of determining

A shall be used.

In any particular race, the same method of determining revolutions shall be used for all boats. Motors must be run at their maximum speed during the taking of revolutions.

When following method C or D, local Race Committee must use their judgment as to the selection of the proper maximum number of revolutions and give due attention to abnormal conditions of weather, see, etc.

maximum number of revolutions and give due attention to abnormal conditions of weather, sea, etc.

Up to the present time, the racing rules have provided that all types of boats, including hydroplanes, must be equipped with some form of mechanical reverse gear or other reversing device capable of driving the boat astern at a speed of at least 4 miles an hour. This rule is a good one except in the case of hydroplanes which on account of their design and for other obvious

capable of driving the boat astern at a speed of at least 4 miles an hour. This rule is a good one except in the case of hydroplanes which, on account of their design and for other obvious reasons, never have occasion to go astern. However, it is essential that hydroplanes be equipped with some device for stopping the propellers, so a new rule has been adopted allowing hydroplanes to be equipped with any efficient "idling" method instead of reverse gears as formerly.

The American Power-Boat Association has been fortunate in having presented to it a number of valuable perpetual trophies during 1920. These include the Cruiser Championship Trophy presented by the New York Athletic Club, and the Scripps Silver Trophy for the restricted cruiser class.

Another trophy which promises to be as popular as the famous Gold Cup for hydroplanes and the Fisher Trophy for displacement boats powered with marine engines, is a new trophy which has been presented by G. A. Wood and Carl G. Fisher. This new trophy is for runabouts and will entirely clear up any doubt in the mind of anyone as to the feasibility of the requirements of the Deed of Gift governing the original Fisher Trophy, particularly the requirements limiting competing boats to those powered with stock marine engines. As the new trophy is for a free-for-all race along exactly the same requirements as those of the original Deed of Gift, except that the stock marine engine requirements have been waived, there will therefore be classes for displacement runabouts powered with any type of motor. This solution of the question seems the most logical one. There

of the original Deed of Gift, except that the stock marine engine requirements have been waived, there will therefore be classes for displacement runabouts powered with any type of motor. This solution of the question seems the most logical one. There are now classes for all types of hydroplanes and runabouts with restrictions which will bar no one.

The Deed of Gift of the original Fisher Trophy provided that next summer's races for this trophy should be held at Lake George. Due to some circumstances which were not known at the time this Deed of Gift was prepared, it now appears that it will not be possible to hold these races at Lake George as originally planned. As it was also planned to hold the Gold Cup Races at Lake George, which also will be impossible, these naturally will be held at Detroit where the One-Mile Trophy race will also be held. The race for the new trophy which is to be known as the Wood-Fisher Trophy for Unrestricted Runabouts, will also be held in Detroit. This arrangement assures Detroit of a very excellent race in 1921.

Buffalo has been chosen as the location for the 1921 Fisher Trophy Races for runabouts powered with stock marine motors. This year's races at Buffalo thoroughly proved that Buffalo is the ideal location for next summer's Fisher Trophy Races.



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# New England Headquarters for Motor Boat Supplies



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Write today for EMALCO Catalog if you want the best hardware at the most reasonable price. Export orders promptly attended to.

# MALONE HARDWARE COMPANY

"WHERE THAT DOLLAR STRETCHES"

378 Atlantic Ave.

Near Rowe's Wharf

BOSTON, MASS.

# There Are Two Sides to Every Story

(Continued from page 183)

his wife was running in letting him cruise so far from home, and put into Huntington for the night—or the season. In a fit of temper I made the last twenty feet to the head of the harbor in one jump and didn't stop to ask what the further intentions of my host might be.

Even down here in Maine they have some devil-may-care mariners. It is no unusual display of courage for a he-bevy of summer visitors to sail all around Mount Desert Island. I have heard of one boat owner—he's a gentleman, of course, and hires a lobsterman to do the dirty work of starting the engine and steering the craft—who would rather make the Mount Desert circuit than drink gin fizzes. He moors the boat in Southwest Harbor on fine Sundays, instructs the menial to take her out and around to Bass Harbor, where he meets her with the car. Then he and his courageous friends embark and make the perilous passage up through Hartlett Narrows and Mount Desert Bridge and so down to Bar Harbor. And there the car meets them and they return home, while the lobsterman takes her outside and back to Southwest Harbor. In all the annals of deep-sea cruising this hair-raising experience has no

One of the redeeming features of motor boatmen is their yachtiness. On a bright Saturday afternoon you will see droves of them easing down to the clubs in civies, quite indistinguishable from the humdrum holiday-makers who find their pleasure ashore. But as they emerge from the dressing-rooms—ah, what a change! Natty blue coats with four stripes on the sleeves, white flannels, buckskin shoes, and yachting caps with the club insignia giving them a final and inspiring touch of the nautical—to look at them you would say that a 250-foot oil-burner is beneath their notice. And then they shove off from the float in spanking white tenders dewdabbed with cotton rope and board the most palatial 24-foot, knock-me-down, hermaphrodite-type glass-cabin cruisers that ever made a horse-car veteran whiney for suld large symmetric and followed the statement of the state whinny for auld lang syne. And the style and éclat and verve with which they make a landing is something to write to old Professor Knight about. Such seamanship! Such innate skill in getting the lines out, in sagging back on a spring led aft from the bow chock; such a jangle of bells and a shouting of orders to the junior yachtsmen of the family, and such a sight of relief when the boat is made fast and the owner has gone about and straightened all the stanchions. Truly, it is an exhibition that would make an ex-subchaser skipper weep tears of anguish. I repeat that the motor boatmen are a yachty clan.

Of course, I wouldn't be so boorish as to deride your readers without offering them something by way of recompense. And here it is. Please, Mr. Editor, advise them (for me) to set out on a long cruise just for the novelty of it. Tell them in bold type to convert their present anchors into paper-weights and invest in something that will hold their craft in a fresh breeze. Urge them to use their twelve-thread rodes for fish-line and buy gear that will sustain the weight of a sturdy boy; and, oh, please beseech them to ascertain their compass deviation. And then tell them that the United States Government publishes a complete set of charts for tidal waters, and that they are handy things to have about the chart-house once one they are handy things to have about the chart-house once one has learned how to read them. And after you have given all these instructions, advise 'em to shove off. There are Coast Guard stations all along the shore, and there's very little danger if they will only keep their wits about them.

Before I ring down and secure my engines let me say to your readers that there are pleasanter places to be than off Cape Fear or Point Jude or Normans Woe or Seguin or Pemaquid or Baileys Mistake in a blow, but that when you win through and shake the salt water out of your eyes and peel through and shake the salt water out of your eyes and peel off your oilers and groom down the old coffee mill that has stood by you in a pinch—why, then you know what fun it is to be a live motor boatman. And when you have boiled through a smother of foam to enter a strange harbor at dusk and have run down a channel by instinct, knocking all the buoys on the head, red to starboard and black to port, and have been welcomed by the local yacht club—when all this has happened, you will know what motor boats and yacht clubs were made for.

Until at least twenty per cent of your constant readers have hung a "To Let" sign from their home moorings and have made a break for strange waters I'll continue to call them a dock-smashing, comfort-loving, land-lubberly pack of buoy-

Very respectfully yours,

ALFRED T. LOOMIS, Southwest Harbor, Me. The British International Trophy is in England, because the Fauber hydroplane inventions, inspired and made in France, took it away from America; and, if Maple Leaf IV had not took it away from America; and, if Maple Leaf IV had not been compelled to race with a makeshift rudder, which threw a cataract of spray and cut her speed miles per hour, her American competitors would have been as badly outclassed in speed as they were in clean running, as well as in design and construc-tion of hull, so that the Harmsworth Trophy is in England because the best boat won.

English sportsmen were the first to take up the hydroplane, and built V-plane boats to the designs of the inventor, Fauber, whose experimental shop was located in France, and American sportsmen have only to refer to Rudder, September, 1910, to find that the hydroplane was first introduced in the United States by the exhibition of the Duke of Westminster's 40-foot challenger "Pioneer" at the International Cup Race held that year at Larchmont.

challenger "Pioneer" at the International Cup Race held that year at Larchmont.

Editor Bieling says, in his account of the race: "As the boats shot over the line it was apparent almost instantly, even to the most unnautical spectator, that Dixie had met her match, for Pioneer simply sailed through the fleet as if they were stuck in the mud." So the designer who had made his fame on Dixie next took up the hydroplane, but all his professional generosity ever accorded the inventor of the V-plane was the price of a lunch while the host worked his double-acting bilgepump for information he could not get out of books.

History, and the rights of an inventor and pioneer of a new art, justify me in challenging the statement and spirit of sportsmanship back of a news article printed in MoToR Boating of July, which says that Commodore Wood's Miss Detroit V is "pure and simple" the design of her builder.

First, Miss Detroit V has one step. There is nothing new about one step. Bonnemaison's "Ricochet" of 1906 had one step and so did the Ramus design of 1872, which Froude experimented with. The British patent to Dickey, which dates back almost to Ramus, shows two steps; so the designer of Miss Detroit V is not entitled to claim any originality on the number of steps; and the same applies to America's naval architects and writers who have persistently sought to misinform the public and deprive the pioneer of the hydroplane of laurels and rights of the inventor.

Second. I have not observed that the description says anyof laurels and rights of the inventor.

Second, I have not observed that the description says anything about Miss Detroit V having V-planes, but the photographs distinctly indicate at least one V-plane. The patent

tning about Miss Detroit V having V-planes, but the photographs distinctly indicate at least one V-plane. The patent records of the United States and European countries, including Germany, which is the most difficult country of all to secure a patent in, show that Fauber is the inventor of the V-plane and also the concave V-plane.

Third, the photographs of Miss Detroit V in July MoToR Boating of Pirette, Columbine, Pioneer, Maple Leaf IV, the Disturbers, Barnacle, Hydro Bullet, Red Top and other Fauber designs, in which the concave bow gradually flattens toward the step, forming a differential surface plane, which constitutes one of the features covered by the Fauber patents.

Look at the full-length speed photographs of Commodore Wood's challenger, at the top of page 10, and you recognize the familiar lines of the Fauber hydroplanes published during the last twelve years. Thereby Commodore Wood's designer pays the pioneer and inventor of the hydroplane an unintended compliment, but why don't sportsmen admit it in words and acknowledge it in deeds, instead of claiming the credit and laurels of the genius and invention of others who have risked their time and money?

Commodore Wood, officer of the American Power-Boat Association and owners of two skellengers.

Commodore Wood, officer of the American Power-Boat Association and owner of two challengers, is one of America's rich men, reputed to have made millions during the war, while I, as the inventor of the hydroplanes which will race at Cowes for the British International Trophy—the inventor of the V-planes which made the N. C.'s and cross-ocean flight possible, and helped the United States and Great Britain to win the war—I had to spend my time during the war and what cash I could get hold of investigating and exposing a ring of millionaire extortioners and conspirators back of the Aircraft Trust, which I characterized in my testimony before the House of Representatives' Committee as a "murderous conspirator."

Trust, which I characterized in my testimony before the House of Representatives' Committee as a "murderous conspiracy, an absolutely treasonable conspiracy in war times."

The Congressional Record and other evidence show that my work has been instrumental in saving two million graft on trust-owned patents and that my pamphlets and publicity campaign started the Senate investigation, which resulted in saving many lives and millions of dollars, yet I have appealed in vain to many of America's sorteners and millionsies for a little to many of America's sportsmen and millionaires for a little money to help me in this work.

Very truly yours, W. H. FAUBER, Brooklyn, N. Y.

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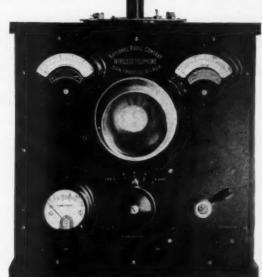
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## Motor Boats Now Factor in Fishing Industry

(Continued from 156)

#### CONSIDER THE "POOR SHRIMP!"

But it is in the production of salt and fresh-water shrimp—two varieties whose chief distinction is a matter of size and habitat—that the Louisiana fisheries excel. In this industry for the year ending April 1, 1920, there were 225 large vessels, about equally divided between sailing and auxiliary schooners, of 50 to 200 tons; 675 motor boats using trawls, and 360 using seines, with 18 boats of 10 to 50 tons transporting the shrimp

harvest to market and to the canneries.

harvest to market and to the canneries.

The total value of the equipment, boats, canneries and shore and sea equipment of the shrimpers is placed by the Conservation Department at \$1,326,525. The total value of the crop, both salt and fresh water shrimp, taken in the year ending March 31, 1920, was \$1,523,029. In other words, the industry paid more than 50 per cent on the capital invested, allowing 50 per cent for costs of operation, about the estimate made by the State Department of Conservation. Dealers' profits, costs of handling, etc., bring the real value to the State of the shrimp industry up to about \$1,828,029. It would be worth about \$150,000 without the use of motor boats. 000 without the use of motor boats.

#### MISCELLANEOUS FISHERIES

There are large numbers of motor boats employed, off and on, There are large numbers of motor boats employed, off and on, at various and varying seasons of the year, in other fisheries, such as those for the diamond-back terrapin, worth some \$150,000 a year; turtles, producing about \$50,000 a year; frogs, valued at \$100,000 a year, and crabs, bringing in \$65,000 annually. No record is kept of boats occupied in these industries, but there are probably 100 motor craft at this work in the different seasons for each kind of sea food. The diamond-back terrapin and the frog-leg fisheries especially, are increasing rapidly, and probably within the next year or two will demand more boats, and as regular systematizing of records as the other fishboats, and as regular systematizing of records as the other fish-

eries. In short, there appears to be, all along the Gulf of Mexico coast, and especially in Louisiana waters, a steady and considerable increase, not alone in the value of the fish taken, but in the quantity and in the number of boats required to take this harvest from the sea. The sailing boat is passing rapidly, either altogether out of the industry or into the auxiliary. Many of the old-time fishermen are slow to make the change from sail to power, but so many of the younger men who went away in Uncle Sam's service and saw there the work of the gasoline engine have returned with more modern ideas, that it needs but an hour's talk by a practical man and a demonstration of the an hour's talk by a practical man and a demonstration of the results of such installation to get an order. Almost all these theusands of fishermen have had a highly profitable year; if they can be shown wherein and whereby they can make more profits next year they will invest in power to make them.

#### For Fishing in Florida (Continued from page 156)

With a maximum speed of 18 miles this boat is capable of being throttled down to three miles per hour for trolling. In this there is a flexibility that enables one to get to the fishing grounds and back without loss of time, and a trolling speed without employing the use of a third motor as adopted in some fishing boats. This boat is well designed, well proportioned and with a generous flare, all of which go to make up a comfortable sea-worthy design. If one studies this new design for a moment and considers its being finished in a high class manner, it is realized at once that it is a fast cruiser for day service, a boat for short cruises, and one ideally adapted for fishing. The engine room accommodates guide and captain, a sufficient crew to delve into the haunts of Florida's game fish.

Now let us turn to a prominent Philadelphian who has spent many seasons in Florida waters enjoying the thrills attending the rod and reel there, and examine his idea of a Florida fishing boat. With a maximum speed of 18 miles this boat is capable of

ing boat.

His chosen length is 55 feet with a beam of 10 feet 6 inches, and a draft of 2 feet 9 inches. His power installation consists of two 150 horsepower motors, with a centre engine used for trolling purposes. The controls of these three engines are The controls of these three engines are led to the steering position at the forward end of the cockpit. The engines are arranged aft of midships under cabin trunk with galley, ice-box, etc., arranged forward. Two single berths are located in either side of passageway leading into owner's private state room. Toilet and lavatory are conveniently arranged as shown on drawing.

nently arranged as snown on drawing.

In this design the owner has an ideal layout, well adapted for fishing and cruising even though it may seem beyond the accepted length limit. The writer had the extreme pleasure of inspecting this boat which is being built in a New York City yard. It looks promising from every standpoint, ruggedly constructed, well proportioned and luxuriously equipped and fin-

ished. The owner's idea in developing this craft has evidently been to combine cruiser accommodations with fishing facilities. This type, while primarily designed for Florida waters, is well adapted for Northern waters.

## The Venice of the East

(Continued from page 156)

cylinders as possible, so that the dense air joins the stream of hot vaporized kerosene and gets at once into the hot cylinders without any chance of condensing the kerosene vapor.

without any chance of condensing the kerosene vapor.

"The two American motors fitted up with this apparatus run with an exhaust as clear as with gasoline. The ignition plugs are cleaned about once a month or more and it is the lubricating oil only that soots them up. One of these 12 h.p. motors is in a boat 32 feet long by 6 feet, shallow draft, has a fixed awning the whole length, with a cabin aft where six people can sleep, and six more on the roof under an awning. The motor also drives a dynamo of 20 volts 14 amperes, charging 16-volt storage batteries for lighting the boat when cruising, and when at home this boat goes to town and back 16 miles daily, and is able to keep the batteries charged up for lighting a small bungalow. The boat has been in constant work for seven years, and the motor was also placed on shore once to drive a pump to keep floods out of a fruit garden, doing the work night and day for many days on kerosene. After this arduous labor we thought the motor deserved to have new white metal in the bearings, and that is about all the repairs it has ever required. I have now sold the boat with the original motor in it at a higher price than when I built it. The excellence of the material of this moderate priced American motors in superb, I send two photos of this boat.

"It takes a great deal of time and expense to fit on kerosene vaporizers to petrol motors like the above, therefore the agents for American motors in Siam were requested to tell the manufacturers to send out motors fitted for using kerosene, and they have now sent out two kinds. One has the exhaust manifold cast with an outer casing through which the kerosene and air passes, and when going all out are very highly heated, no extra cold air being admitted anywhere except that passing through the hot vaporizer. The consequence of this is preigition and knocking. By giving more kerosene the pre-ignition certainly stops but the exhaust gets very dirty, there is no provision for extra cold dense air to burn this extra kerosene. Every

provision for extra cold dense air to burn this extra kerosene. Everything is supposed to be automatic and fool proof, but this kind of vaporizer one would like to have some hand-regulated extra-cold-air-valve to pay about with. This variety of vaporizer is so hot that the motor can only go slow for some time without getting too cold. About three-quarter speed only is satisfactory for use with this kind of vaporizer.

"The other variety has a covering on the top of the cylinder heads through which the vaporizer pipe passes, or at times only hot air is drawn from the exhaust pipe for vaporizing the kerosene. These two varieties will go on kerosene if the motor is kept very hot by going at good speed, but if it is slowed down for any length of time liquid kerosene is very apt to get into the cylinders and stall the motor.

"Having sold my boat, and wanting a motor for a new one,

"Having sold my boat, and wanting a motor for a new one, I have been around to all the stores selling American motors, and find that they are pure gasoline or of the above varieties

that use kerosene.

that use kerosene.

"One American motor of very neat and compact design of 17-25 h.p. has been lying in a store for about two years. This is a suitable size for a runabout for those who have limited purses, and is very much admitted, but no one has bought it because it uses gasoline only, and there is no chance of successfully fitting a vaporizer for using kerosene as its compression is too high. There are a few high power American motors here using gasoline in express cruisers belonging to parties who can afford to buy them, but they are beyond the reach of those that have to use a runabout every day and have to use between the supplementation. have to use kerosene.

have to use kerosene.

"I have selected an American gasoline motor, the compression of which will be suitable for using kerosene, but again I have to make a vaporizer, a new throttle valve, and an extra-cold-air-valve, etc., in order to make it suitable for our crowded traffic and be able to go slow for a long period on kerosene and to be flexible. I am not mentioning the name of this motor, as the manufacturers have a motor on the market here for using kerosene, but this is one of the vaireties I have mentioned above and which is not good enough.

"As American motors are going into this country more and more every day, and from my own experience they are well

"As American motors are going into this country more and more every day, and from my own experience they are well constructed and of good material, but are only wanting in some details, therefore, the criticism which I have made about the use of kerosene, and what I am going to say further, I hope will be taken in the right spirit, as the end in view is the getting of motors to which no alterations will have to be made to suit this country, and if suitable for Siam they will also meet the requirements of the East in general."

## SPEEDWAY

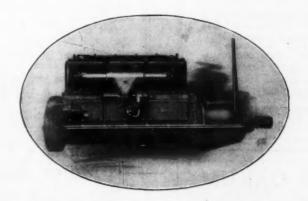
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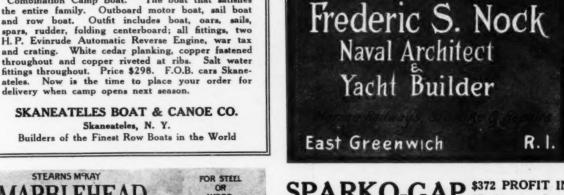
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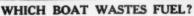
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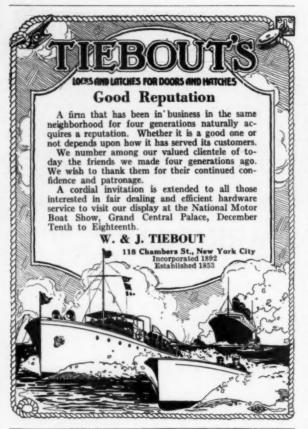
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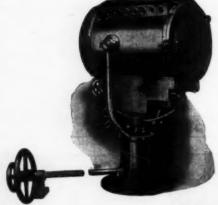
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### Fog Robbed of Its Terror

(Continued from page 154)

United States during the single year of 1919. The money loss in the preventable delay to all these vessels by reason of fog is simply unbelievable. The steps being taken to install piloting cables along the coast with the beginning made in New York Harbor will tend to reduce this heavy loss. Our drawings show that plans are under way to install submarine cables in and around the harbor to make it completely fog proof. Any vessel equipped with radio can get accurate bearings and positions by means of the radio direction finder already installed by the Government along the coast. It is now a relatively simple problem to navigate a ship to the harbor entrance. The problem of continuing up the harbor has been solved by the Audio device following the submarine cable. The cables in the harbor will have individual numbers. Cable 1 will be used to take a vessel up to Quarantine. Cable 2 will lead up through the Hudson River. Cable 3 will lead from Staten Island up the East River. Another will traverse the length of Long Island Sound, another will continue down the ocean side of Long Island, still others will encircle treacherous shoals and when the vessels enter the magnetic field of these cables it will be instantly apparent to the listener at the instrument that the ship is entering a dangerous area.

The Destroyer Semmes which has been equipped with an experimental installation of coils and audio frequency receiving apparatus, was used in the tests mentioned previously. A large delegation set sail one fine morning not long ago and the course was laid for the Narrows. When in the vicinity of Fort Lafayette, the magnetic field about the shore end of the cable was picked up in the head phones attached to the instruments and by throwing a small switch first to one coil and then the other it was easily discerned that the greater strength of signals came from the port coil. This indicated that the ship was approaching the cable and later when the starboard coil gave the strongest signals it indicated that the ship had cro to try the apparatus for themselves. The strength of signals is governed by the strength of current used to energize the cables and can be made to almost approach the blast of a steam whistle. On the return trip the pilot house windows were blanketed and the captain of the vessel, Comm. H. H. Norton, acted as pilot. His navigator, Lieut. Clark, stood by and the quartermaster was at the wheel. The Ambrose Light Vessel end of the cable was picked up readily and a course set parallel to it. This is 306 degrees magnetic and by means of a slight correction from the captain as 300 or 310 degrees the quartermaster was enabled to keep the vessel in the channel without being able to see a thing. No difficulty was encountered in negotiating the turns in the channel. The new course was set following the cable around the bend until it again agreed with the line of the cable.

with the line of the cable.

The applications of this method of ship control is not limited to large vessels. A small portable coil sixteen or eighteen inches in diameter and a vacuum tube amplifier using dry cells and occupying less than one cubic foot of space will enable the small yacht and motor boat to operate as safely and surely in the force its larger brothers.

the small yactt and motor both to operate as savely and surely in the fog as its larger brothers.

The magnetic field created about this cable also extends into the air. An airplane or seaplane equipped with the small coil and amplifier can be apprised of its location in the same way

Tests have been made and the magnetic field has been found to extend for more than a mile up into the atmosphere. In actual service a strong magnetic field is created around the landing field. The plane following the submarine cable in the same manner as a ship, leaves it to travel overland, and when it enters the strong magnetic field over the landing place, comes down slowly until it is enabled to select a proper spot for

down slowly until it is enabled to select a proper spot for alighting.

Several other useful applications of the amplifier principle are what might be termed "in the work." These are, however, not quite ready for disclosure at this time. They are things which would be of no service on shipboard so that there is no need of mentioning them further at this time.

It seems as if the need for this device is greatest among the numerous sea-going commercial vessels, then all of the motor boats and yachts could make use of the instruments also. The banker yachtsman could hurry back to Wall Street in spite of fors when things were not going quite alright. And also. The banker yachshan could harly back to wait speed in spite of fogs when things were not going quite alright. And finally, airplanes and seaplanes in postal and private service when equipped for the purpose would be enabled to make a correct landing under any and every condition of fog.

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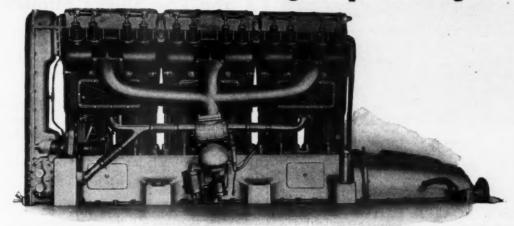
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No. 7—Block Island to
Vineyard Sound, in-

cluding Narragansett
Bay
No. 8—Delaware Bay
No. 9—Chesapeake Bay,
Part I, Upper Part
No. 10—Coast of Maine,
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No. 11—Hudson River,
Kingston to Albany
No. 12—Chesapeake Bay,

Part II, Central Part

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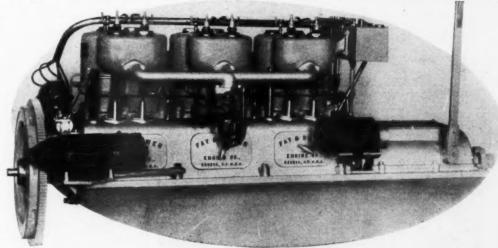
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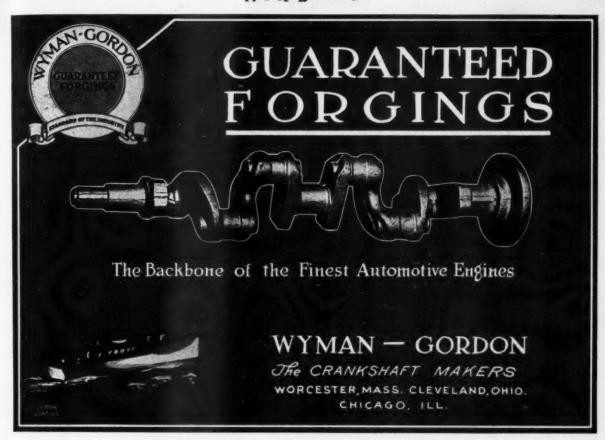
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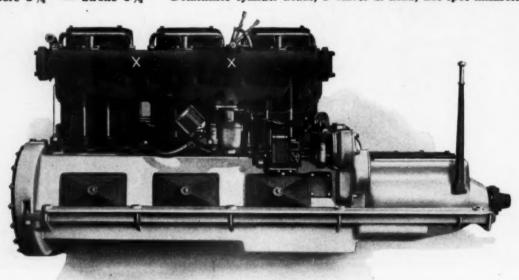
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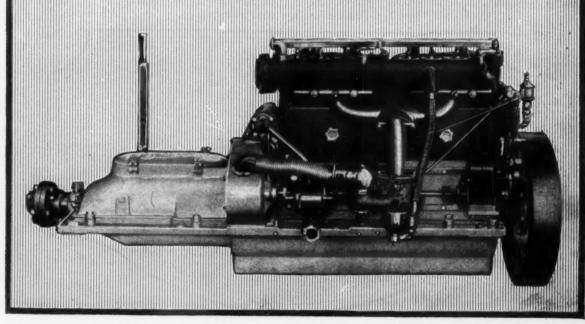
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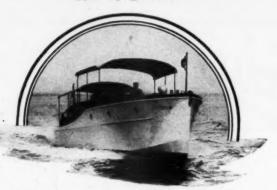
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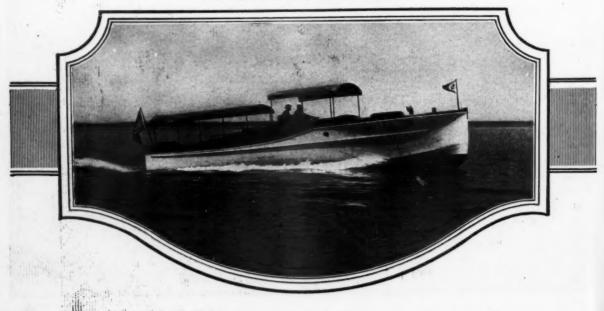
And it is men with such experience as Mr. Hand has, who recommend and use Columbian Bronze Propellers.

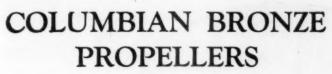
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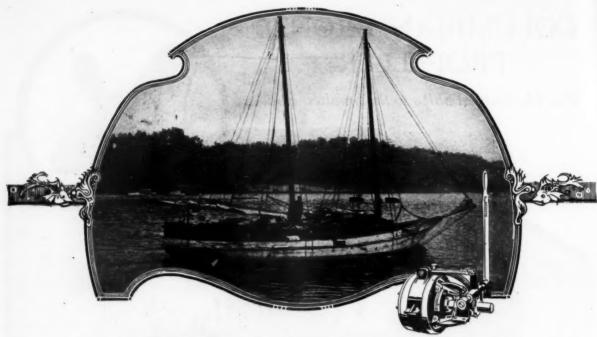
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COLUMBIAN BRONZE CORPORATION

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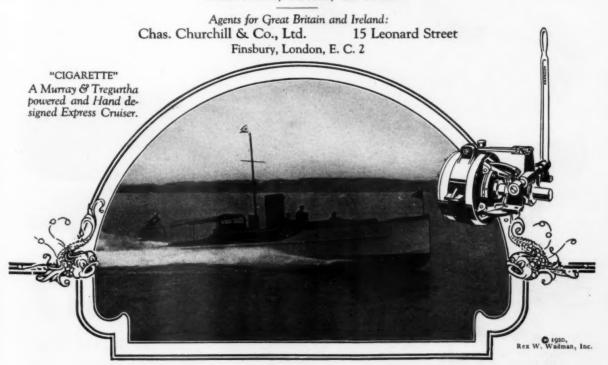
MURRAY & TREGURTHA engines—of the high speed type—rank as the largest units manufactured in this country. They are equipt with Paragon Reverse Gears.

As are a majority of the better type of American and Foreign marine engines.

Looking behind the scenes for a reason for this almost universal adoption of *one* type of reverse gear by practically every engine manufacturer, you will find that Paragon Reverse Gears are designed and built by an organization that has concentrated itself on the production of good reverse gears for so long that it is an almost hopeless task for any other gear builder to hope to attain their degree of experience, accuracy or accomplishment.

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## PARAGON GEAR WORKS TAUNTON, MASS., U. S. A.



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"Leopard V," 30 footer. Competed in 14 races in seven weeks. Most consistent runabout in America.



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We have the largest and best equipped plant devoted to the construction of high efficiency marine engines, and a highly skilled working force specializing in mechanical work of the highest degree of accuracy.

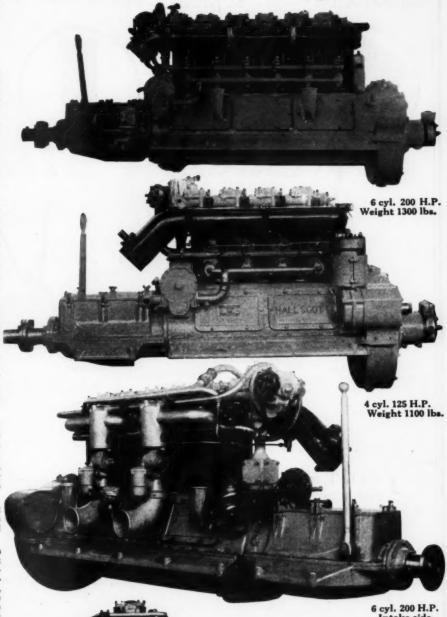
Our experimental laboratory is the most complete testing laboratory owned by any marine engine company in this or any other country, and enables us to thoroughly analyze and make exhaustive tests on all parts and devices before adopting them on our engines.

We sell not only engines but Service, and Hall-Scott service is Real, as any owner will tell you.

We have not lost a single Bearing, Connecting Rod, Piston, Cylinder, Crankshaft or other major part in any of our engines

Interchangeability is a fact, not a "theory" in our plant. Close to a million dollars in tools and fixtures makes this a reality.

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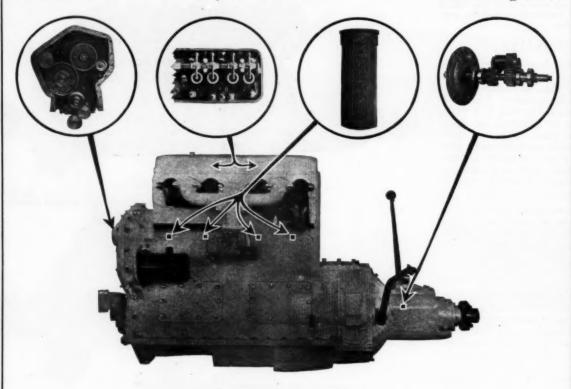
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## J. V. B.

TWELVE months of the most exacting service in boats up to sixty-five feet in length have stamped this standardized marine engine as quiet, smooth and vibrationless; of high quality, very economical and extremely dependable. It has verified every claim of its designer, Joseph Van Blerck.

THIS exceptional engine will be exhibited at the National Motor Boat, Ship and Engine Show at the Grand Central Palace, New York, December tenth to eighteenth.

Price completely equipped \$1,250.00 F. O. B. Cleveland.

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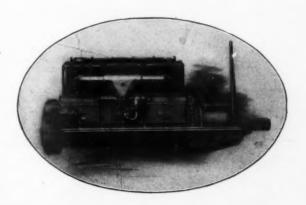
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MORRIS HEIGHTS, NEW YORK CITY





### Motor Boat Shows of the Past

Exhibitions at Madison Square Garden and Grand Central Palace Which Have Made History for the Sport and Industry

By John J. Amory

President, Consolidated Shipbuilding Corp.

HE first display of a Motor Boat was in 1889, at the American Institute Fair, when the Gas Engine & Power Company exhibited a twenty-one-foot two horsepower launch. Further displays by the same people,

Sportsman's Show again had displays of motor boats by former exhibitors, and also some firms were represented showing marine boat engines. Notable among these were the Marine Vapor Engine Co., showing an Alco-Vapor Launch; the Truscott Boat Mfg. Co., of St. Joseph, Michigan; C. C. Riotte &

Photographs by M. Rosenfeld

Launch; the Truscott Boat Mfg. Co., of St. Joseph, Michigan; C. C. Riotte & Co., the latter becoming so well known in after years as the designers and builders of the Standard Engine.

The third Sportman's Show was held in 1899, and the fourth in 1900, the last marking great progress in motor boating interest, for the show management set aside at the easterly end of the Garden the sumptuous space of seventy-five by one hundred feet exclusively for Motor Boat Exhibits. A clipping from the New York Commercial Advertiser of January eleventh of that year says that this space will contain collectively as imposing and interesting exhibit of small craft as it is possible to conceive. The leading builders of the country have taken space, and models will be shown well calculated to set every lover of boating to figuring on the state of his finances, etc., etc. But with all this, the shows, as far as the motor boats were concerned, in the years of 1901 to 1904 were far from satisfactory, from a boatman's viewpoint; even with increas-



A view of the 1913 Motor Boat Show at Madison Square Garden, New York City

of the same character of boat were made at the same place by the same firm in subsequent Institute Fairs from 1890 to

In 1897, however, there was held at Madison Square Garden a so-called Gas Exposition, and at that time exhibits were offered by Fairbanks, Morse & Co., Meitz & Weiss and Globe, the latter the product of the Pennsylvania Iron Works. On that occasion I believe the only boat with power shown was one of the Gas Engine & Power Co.'s naphtha launches. Later, in 1897, the first Sportman's Show was inaugurated, and exhibits were made of boats with power by Pennsylvania Iron Works, Daimler Motor Co., of Steinway, L. I., Gas Engine & Power Co., and The New York Yacht, Launch & Engine Co., both located at Morris Heights, New York

Opening on January 13th, 1898, the



Looking at the 1913 Show from the front of Madison Square Garden



The 1915 Motor Boat Show was the last to be held at Madison Square Garden. This was the first year that the large boat predominated

ing interest and a larger number of boat exhibitors, that department was largely overshadowed by the Sportsman's equipment, rod and gun and camp outfits.

Early in February, 1904, the first distinctive Motor Boat Show was held in the Herald Square Exposition Hall, then located on the top floor of the Macy Building at 34th St. and Broadway. This display was made under the auspicious title of the National Motor-Auto Boat Exposition.

In this name is reflected the interest that automobile engine manufacturers had finally taken in an effort to adopt motor car engines for motor boat service. Most of the old boat exhibitors participated in this show, and there were new names, such as Panhard, Lozier, Smith & Mably, and Babcock, Atwood & Bowen. This disposition on the part of the Engine and Boat Manufacturers to have more distinctive recognition, resulted in 1905 of hitching a new name to the old Sportman's Show, and inaugurated at that time the first Annual Motor Boat Show, held under the auspices of the National Association

of Engine & Boat Manufacturers. This 1905 show was held at the Garden in February, and was unique in the fact of having an artificial lake constructed wherein were shown a number of motor boats under actual running conditions. While this show was still coupled with the Sportsman's Exhibit, the boat end of it occupied over eighty per cent of the total exhibition space. The Exhibition Committee was composed of Henry R. Sutphen, Chairman;





The 1916 Motor Boat Show. The first of the recent exhibitions to be held in Grand Central Palace



15

The entrance to the Palace at the 1918 Show

J. S. Bunting, A. Massenat, and J. S. Matthews.

Exhibit of Gas Engine & Power Co. and Charles L. Seabury & Co., Cons.

Models of power craft and two boats on floor, one 32' 6" long, with 25 to 35 H.P., 6 cylinder motor and a speed of 19 miles per hour. Naphtha launch also shown. Motors shown from 10 H.P. to 60 H.P., latter in operation. In the water was shown a 33' motor boat,

water was shown a 33' motor boat, named "Speedway," with a 4-cylinder motor, capable of driving the boat eleven miles per hour. This speed was very high for those days and the type of power used.

25' boat with 30 H.P. Panhard motor, guaranteed speed 17½ miles per hour. In the water a 30' electric launch with a radius of 75 miles on one charge. Latter boat named "Rest-a-While."

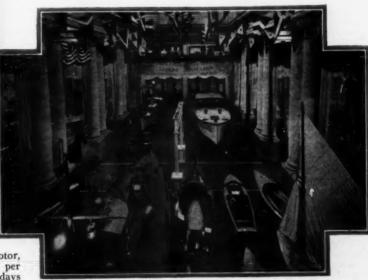
named "Rest-a-While."

Other exhibitors at the 1905 Show who are still with us are The Chas. D. Durkee & Co., Inc., with their old familiar sign, "Hardware for Wet Places"; The Mianus Motor Works, Palmer Bros. Engines, Inc., and James Craig. Mr. Craig exhibited the 8-cylinder motor from "Onontio," also a 4-cylinder motor of 24 H.P. and a 3-cylinder motor of 18 H.P. The Carlyle Johnson Machine Co. were also in this Show with their reverse gears.

Other exhibitors not now with us were as follows:

Other exhibitors not now with us were as follows:
Buffalo Gasolene Motor Co., Lozier Motor Co., William

(Continued on page 154)



The 1917 Motor Boat Show at Grand Central Palace, New York

## What the National Association Is Doing

Activities Along Lines Planned to Aid the Entire Industry—Progressive Methods Which Will Make the 1920 Motor Boat Show the Best Ever

By Ira Hand

THE National Association of Engine & Boat Manufacturers is composed of 150 corporations or concerns in this country engaged directly in the production of boats, engines or marine accessories, and in the advancement of the interests of motor boating wherever the sport

may be indulged in.

In the sixteen years of its existence the Association has seen many changes in the industry itself and in the development of the sport of motor boating. New companies have sprung into existence, attained a degree of prominence for a brief interval and then have passed "over the horizon." Again, concerns like the Lozier Motor Co., Panhard-Levassor, E. H. Godshalk & Company, The Spaulding Gas

Engine Works, and others were extremely active in the old days, but these names would be meaningless to yachtsmen of the present day. On the other

men of the present day. On the other hand, many of the original members of the Association are still active in the industry, and their trade names have become a by-word with the hundreds of thousands of motor boating fans now in existence.

The Consolidated Shipbuilding Corporation was then known as the Gas Engine & Power Co., and Chas. L. Seabury & Co., Cons. The Elco Works was then known as The Electric Launch Co., while many other concerns still in the ranks after all these years are The Bridgeport Motor Co., The W. H. Mullins Co., Frederic S. Nock, Buffalo Gasoline Motor Co.

Nock, Buffalo Gasoline Motor Co., Wolverine Motor Works, and Chas. D. Durkee & Co. In the first year the Association had increased its membership to 74 companies and in that time representatives from the following concerns who are still identified with the Na-

tional Association had been added to the rolls: James Craig Engine & Machine Works, The H. C. Doman Co., Fay & Bowen Engine Co., Murray & Tregurtha Corp., The Carlyle Johnson Machine Co., Tams, Lemoine & Crane, A. B. Sands

& Son Co.

For the first fourteen years of its existence, the National Association was successfully headed by President John J. Amory, to be succeeded in 1918 by Henry R. Sutphen. Other well known men in the industry in whom the representation of their companies in the National Association is still vested are H. H. Brautigam, James Craig, Walter L. Fay, Frederic S. Nock, H. L. Aldrich, Chas. D. Durkee and

Andrew Paterson.

At the Sixteenth Annual National Motor Boat, Ship & Engine Show to be held in Grand Central Palace, December 10th to 18th, there will be exhibits by eleven of these members who had become identified with the National Association prior to May 1st, 1905. These companies represent the backbone of an industry that has struggled bravely onward through all of the periodic depressions in business that have come to the motor boat trade, as well as to others. The companies that have weathered these years are strongly entrenched today and occupy a commanding position in the trade. There have, of course, been "fat" years as well as "lean" ones, the most serious set-back of all, however, coming with the world war which started in 1914. The situation for many then became acute. There were few, if any, sales, materials reached unholy heights in cost and

in some cases could not be obtained at all, while even the sport of motor boating itself was seriously curtailed by Governmental restrictions as to the use of water craft of all kinds.

Many of our companies devoted all, or nearly all, of their facilities to the furtherance of Uncle Sam's war program, building submarine chasers, mine sweepers, patrol boats, tugs, barges, dispatch boats, and even ships for our country's use here and abroad. Engines fitted to these types of boats had to be produced and produced quickly. Marine fittings in hitherto undreamed of quantities had to be prepared. Some of the engine manufacturing companies built pumping sets, some built tractor or truck motors, others built

generating and lighting units,—all digging in bravely to do their share in the

vast war program.

Peace came, with its problems of readjustment of labor and other conditions, and a taxation burden that amounted in effect to almost complete annihilation of the industry after its patriotic service. Some of these drawbacks are still with us, but our builders and manufacturers have slowly, but surely, started to build up again the business that had suffered an interruption lasting nearly four years.

The past season gave indication that motor boating was coming back to its own and the next few years, at least, promise a just reward in the way of a real business activity to those

who have had the courage to hang on.

The coming Show is but one piece of evidence in support of all this. As this is being written, nearly a month in advance of Show time, the fact is recorded that more exhibition space has already been sold for the December ex-

hibition than has ever before been contracted for in the history of the National Association. It becomes evident then that our members have faith in the future of the business, and that the selection of the early dates for the Show was a wise one in that it will give the exhibitor fully two months additional time to care for the volume of business

that will undoubtedly be placed at the Show.

For many years Henry R. Sutphen served as Chairman of the Exhibition Committee of the Association, giving unsparingly of his time, thought and energy to the develop-ment of the National Shows. The success of each of these exhibitions bears testimony to his wisdom, broad knowledge of affairs and careful and conscientious guidance. he was placed at the helm of the Association, his position as Chairman of the Exhibition Committee was assumed by the retiring President, John J. Amory, who had served as an ex-officio member of the Show Committee throughout his term of office. President Sutphen still finds time to attend all meetings of the Show Committee, and associated with these two pioneers of the industry are James Craig and Charles A. Criqui. James Craig has been a member of the Exhibition Committee since the earlier Shows at Madison Square Garden, while Charles A. Criqui took the place on the Committee that had been vacated by the retirement of Scott J. Matthews from the business. Fitted by their long association with these exhibitions, and by the successful prosecution of their own business activities, these men still (Continued on page 191)



## Exhibitors at the 1921 Motor Boat Show

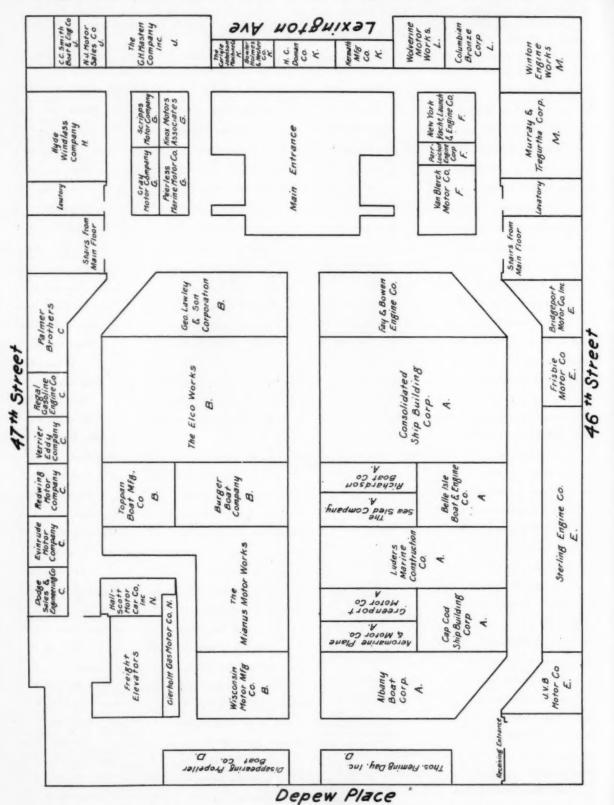
In the list below will be found the names and addresses in alphabetical order of all the boat, engine, and accessories exhibitors at the National Motor Boat, Ship & Engine Show, held at the Grand Central Palace, New York City, December 10-18, 1920.

The space occupied by each exhibitor is mentioned, as are the names of the individuals in charge of the particular exhibits, forming a valuable guide and directory to the entire show.

| Auto Engine Works St. Paul. Mini   | n . |
|--|-----|
| Auto Engine Works St. Paul, Mini Space O J. D. Moone Aeromarine Plane & Motor Co Keyport, N  | y   |
| Space A 6  | J.  |
| Albany Boat Corporation Watervliet, N. 3   | ť.  |
| Space A 7  L. L. Trip  American Balsa Company, IncNew York City, N. 1  | p   |
| Conce 70 91  | 1-  |
| American Bosch Magneto CorpSpringfield, Mass<br>Space 90  A. H. Bartsch, C. E. Graesse   | 3.  |
| Space A 4 E. M. Gregor Bowler, Holmes & Hecker CoNew York City, N. 1   | 1   |
| Space A 4 E. M. Gregor   | y   |
| Space A. L. Ranki  | 33  |
| The Bridgeport Motor Co., Inc., Bridgeport, Cont   | 1.  |
| Space E H. H. Brautigar<br>Brooklyn Varnish Mfg. Company Brooklyn, N. Y  | n   |
| Space 26-27 C. B. Andrew Burger Boat Company. Manitowoc, Wis Space B 4 H. C. Burge Christensen Engineering Co. New York City, N. Y                         | s   |
| Space B 4 H. C. Burge  | r   |
| Christensen Engineering Co New York City, N. Y<br>Space 11   |     |
| Cape Cod Ship Building Corp Wareham, Mass  | ١.  |
| Space A 6 C. S. Gurne The Carlyle Johnson Machine Co   | y   |
| Space K J. H. Robert   | S   |
| Space 41 F. S. Woo   | d   |
| Champion Spark Plug Co   | 0   |
| Space 41 F. S. Woo Champion Spark Plug Co Toledo, Ohi Space 33 E. M. Sterr Consolidated Shipbuilding Corp Morris Heights, N. Y                             |     |
| Space A2-A3  C. G. Amor  | ÿ   |
| Space A2-A3 Columbian Bronze CorporationNew York City, N. Y Space L J. H. Curtiss Company, IncNew York City, N. Y  | g   |
| J. H. Curtiss Company, Inc   |     |
| Cutting & Washington Radio Corp New York City, N. Y  |     |
| Space 17 Thos. Fleming Day, Inc  | 7   |
| Space D 2 The Debevoise Company  | y   |
| Space 29 F. W. Tibbe   | n   |
| Dean Engineering Company   | i.  |
| Disappearing Propeller Boat Corp Tonawanda, N. Y   |     |
| Dodge Sales & Engineering Co New York City, N. Y   | n   |
| Space D 1  Dodge Sales & Engineering Co New York City, N. Y  Space C  The H. C. Doman Company.  Oshkosh, Wi  Space K  R. K. Thibe                          | y   |
| Space K R. K. Thibe  | Γ.  |
| Space K  Domestic Electric Co., Inc New York City, N. Y  Space 14-15  C. G. Olse  Chas. D. Durkee & Company, Inc New York City, N. Y  Space 92  F. K. Wick | n.  |
| Chas. D. Durkee & Company, Inc New York City, N. Y   |     |
|  |     |
| Space 30-31 C. G. Meeke The Elco WorksBayonne, N.  | Т   |
| Space B2-B3 T. S. Hanso  | n   |
| Space B2-B3  Hubbard H. Erickson & Co  | 1.  |
| Evinrude Motor CompanyMilwaukee, Wie   | B.  |
| Space C Fay & Bowen Engine Co  | n   |
| Space A 1 J. M. War  | Œ   |
| Fire Gun Mfg. Company New York City, N. Y<br>Space 82  |     |
| The Francke Company  | a   |
| Space 50 A. W. Sheper The Frisbie Motor Company  | h.  |
| The Frisbie Motor Company Middletown, Conr<br>Space E Wm. E. Gib<br>E. Fougera & Co New York City, N. Y<br>Space 3 W. H. Sterlin                           | b   |
| Space 3 W. H. Sterlin  | 8   |
| Space 71 H. Schwart  | Z   |
| Great Lakes Boat Building Corp Milwaukee, Wil  | 8.  |
| Space 66 W. C. Morehea<br>Generator Valve Company  | 1.  |
| Space 63 J. Jame   | S   |

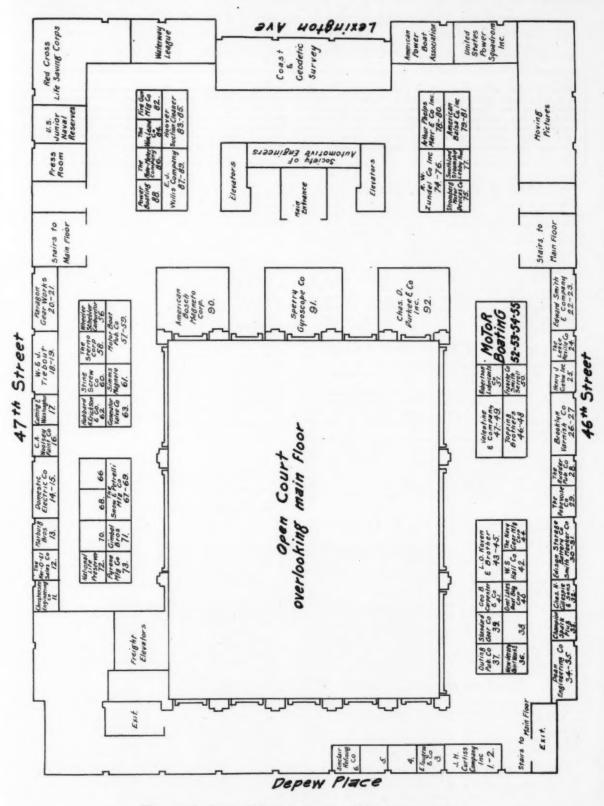
| ide and directory to the entire show.   |
|---|
| Henry J. Gielow, Inc  |
| Space O  Chas. H. Gillespie & Sons.  Space 32  Gray Motor Company.  Space G 1  W. C. Disbrow, H. N. Link  Greenport Basin & Construction Co   |
| Space A   Hall-Scott Motor Car Co., Inc.   Berkeley, Cal. Space N   A. J. Utz   |
| Space 83-85 Hyde Windlass Company   |
| Space H E. F. Ramsay The J. V. B. Engine Company  |
| Space E Kermath Mfg. Company.  Detroit, Mich. Space K The Ker-o-El Sales Co. Cleveland, Ohio Space 12 E. H. Croft   |
| and motors Associates   |
| Space G 2 L. O. Koven & Brother. Jersey City, N. J. Space 43-45 Geo. Lawley & Son Corp. Boston, Mass.   |
| Space B 1 The William Leard CompanyNew Brighton, Pa. Space 84   |
| The Leece-Neville Company Cleveland, Ohio   |
| Space 24  Luders Marine Construction Co. Stamford, Conn. Space A 5  Leard, Wm., Co. New Brighton, Pa.   |
| Space 84 C. H. Vaughan Marburg Brothers . New York City, N. Y. Space 13 F. Marburg The G. H. Masten Company, Inc New York City, N. Y.   |
| Space J The Mianus Motor WorksStamford, Conn. Space B 6 N. A. Holmstrom The Moto-Meter Company, IncLong Island City, N. Y.  |
| Space 86 J. C. Elverson   |
| Space 57-59 Wm. B. Rogers, Jr.:<br>MoToR BoatinG119 West 40th St., New York City, N. Y.<br>Space 52-53-54-55  |
| Motor Boat Publishing Co  |
| National Life Preserver Co  |
| The Navy Gear Mfg. CorpPort Chester, N. Y.  |
| Space J E. E. Cole New Jersey Paint Works Jersey City, N. J.  |
| New Jersey Paint Works  |
| Outing Publishing Company New York City, N. Y. Space 37 Palmer Bros. Engines. Inc   |
| Space Cobyserver Space |
| Parr-Loichot Engine Corp  |
| Space G 2 Power Boating   |
| Space 88 (Continued on page 152)  |

## Diagram of the Floor Arrangements, 16th Annualdo



The main floor space is completely filled from wall to wall with boats and engines

## nuMotor Boat Show, with Location of all Exhibitors



The mezzanine floor is filled to capacity with exhibits of many accessories

## What You Will Find at the Motor Boat Show

Motor Boats, Marine Engines and Accessories of All Kinds Make an Unusually Interesting Display for the Inspection of the Critical Motor Boatman Descriptions of Representative Exhibits Shown at the Grand Central Palace

For the benefit of the thousands of motor boatmen through-out the country who anxiously look forward to the Motor Boat Show each year, and who unfortunately are unable to be present to inspect the engines, hulls and fittings, we take a great deal of pleasure in presenting a synopsis of the exhibits which will be found at the Grand Central Palace. All enthusiasts will be interested to know that

1921 promises great prosperity for the boating world, and from present indications the Show, which commences on the 10th of December and continues until the 18th, will be much more successful than any of its predecessors. A complete list of exhibitors, with names of the representatives in charge, will be found on page 15. Diagrams locating all exhibitors are on pages 16 and 17.

### Fay & Bowen Runabouts

The Fay & Bowen Engine Company, Geneva, New York, are showing one each of their famous 24-foot Junior runabouts and 27-foot standardized runabouts. In addition to these all of the gasoline engines which they produce are also exhibited. This 27-toot standardized runabouts. In addition to these all of the gasoline engines which they produce are also exhibited. This includes the Model L-40 four-cylinder 17 h.p. The Model LN-42, 20-40 h.p., Model L-44, 30-45 h.p. and Model L-63 and 64, six-cylinder motors up to 65 h.p. A Model TG-45 heavy duty motor, 35-55 h.p., with large cylinders, is also included. The boats are snappy little craft with modern design and equipment. They are built with the raised sheer and body in a common of the latest designs and which is particularly effective.

equipment. They are built with the raised sheer and bout in so many of the latest designs and which is particularly effective in small boats because it increases the freeboard just where it seaworthy model.

### Burger 36-Foot Standardized Cruiser

The Burger Boat Company, Manitowoc, Wisconsin, are exhibiting one of their 36-foot Mower designed, Burger built standardized cruisers. This cruiser embodies the experience of many years of boat construction and offers more cruisability for its size and at its cost than had been previously considered possible. By cruisability is meant the comfort of commodious arrangement, together with structural perfection and seaworthiness.

A large bridge deck amidships provides ample space for the open-air recreation of the entire party. Two light, roomy cabins, with full head room, look after the sleeping facilities and accommodate from six to eight persons without difficulty. The power plant is a Scripps model D, four-cylinder, four-cycle motor of 35 h.p., equipped with electric starting and lighting system. The boat is furnished complete with full cruising equipment throughout.

### Masten Showing Caille Motors

G. H. Masten Company, Inc., of New York, are exhibiting Several motors boats and row boats as well as a complete line of Caille Aristocrat marine engines and also the Caille Rowboat motors in their several sizes. Cabin upholstery and draperies, life preservers and Kapok jackets with the Liberty Swimming Relts are a few of the other items shown.

### A Model Radio Room

A model Radio room, with the radio apparatus in operating condition, is being shown by the Cutting & Washington Radio Corporation, of New York. This apparatus is well adapted to small yacht use, and various types and sizes of radio sets are on hand for inspection.

### Standard Reverse Gears

The Standard Gear Company, Detroit, Michigan, is showing in Space 39, on the mezzanine floor, samples of four sizes of standard reverse gear, together with parts entering into their construction. These gears are completely enclosed and oiltight. They run clean and quietly in a bath of oil, reducing

### Van Blerck Fuelizer

The Van Blerck exhibit at the Motor Boat Show consists of a four-, six- and eight-cylinder marine engine and a four-cylinder commercial engine.

All three of the marine engines are equipped with the remark-

able Van Blerck Fuelizer which makes possible a control of these engines in operation from extreme low speed to the extreme high speed without any back-firing, etc.

A special exhibit of this fuelizer is made in the Van Blerck

space, showing its actual operation and its features of design.

### Mianus Heavy Oil Motors

The Mianus Motor Works, of Stamford, Conn., are exhibiting several of their improved Diesel heavy oil engines, as well as their more familiar two-cycle line. The heavy oil models shown include a 60 h.p. four-cylinder model, a 30 h.p. two-cylinder, 15 h.p. two-cylinder and 7½ h.p. single cylinder. Another interesting feature is the latest thing in Mianus-powered lifeboats. A representative line of the well-known two-cycle property is being their their cycles. engines is being shown. The exhibit is in charge of Mr. A. L.

Fairbanks, Sales Manager.

The features representing the radical advancement in internal combustion engine design and development as embodied in the Mianus Improved Diesel heavy oil engine are as follows:

Reliability, as exemplified in the Mianus, has taken on a new meaning with the elimination of the attachments and mechanisms that have been the source of probably 90% of all troubles experienced even with what were recognized as the most re-liable of gasoline and oil engines. This refers to carburetors, magnetos, batteries and ignition appliances of all sorts used on gasoline engines and hot heads, electrical starter and heaters, torches, etc., used on oil engines.

torches, etc., used on oil engines.

Economy of Operation, including not only low fuel consumption and cheap fuel, but freedom from "lay-up" expenses and repair bills, shows an improvement over engines of a few years ago that is almost unbelievable even with the handicap of increasing fuel prices. Where for years one pint per horse-power hour was accepted as the standard of fuel consumption in engines, both oil and gasoline, this has been more than cut in two, and where the fuel in the past must be of a grade at least equal to good kerosene, most satisfactory results are now obtained with the heavy residue oils, costing from one-quarter to one-third the price of gasoline. Operating expenses are further reduced by doing away with the necessity for ever removing carbon by completely burning the carbon. This also represents a saving in the replacements of piston rings and other parts directly and indirectly resulting from the carbon deposits.

Smoothness of Operation has always been sought by improving

Smoothness of Operation has always been sought by improving balance of reciprocating parts and lightening reciprocating parts until there was little room for improvement in balancing. By eliminating the explosion entirely and burning the gas of the heavy oil, a new standard of smoothness has been made possible which, in conjunction with what has already been learned in

ble which, in conjunction with what has already been learned in the way of counter balancing, gives a smoothness of power-flow equal to steam. The advantages of this smoothness is felt in the much longer life of the engine obtained by eliminating the hammer blows of the explosion.

Control of the speed of the internal combustion engines has in the past been accomplished only by sacrificing the cleanness or thoroughness of the gas mixture. This has all been changed in modern systems like the Leissner, as the control of these engines is now accomplished by the shortening or lengthening the period through which the impulse exerts its pressure and the power developed is almost in exact proportion to the fuel used under different speeds, making it possible tion to the fuel used under different speeds, making it possible to take on full load at full speed instantly, even if running throttled down to slowest speed with no load for hours.

Simplicity is increased rather than sacrificed in accomplishing all these things, for in an engine like the Mianus there are no air adjustments, no fuel adjustments, excepting the throttle, no ignition adjustments or valve adjustments.

### Paragon Gear Works

Paragon Reverse Gears are on display at Spaces 20 and 21 on the Mezzanine Floor. Comfortable chairs are provided for the customer friends who drop in and the appearance of the exhibit creates an atmosphere of friendliness and service.

The Paragon line is represented by one model of the Yoke Operating Type of Paragon. This newer model was brought out to meet the more exacting requirements of engine builders. Its shortness and compactness have given it such popularity that warranted the dropping of other Paragon models from the line. The general design and construction are along the time-tried

The general design and construction are along the time-tried lines, yet minor improvements in the operating mechanism have been incorporated in keeping with the Paragon principle of maintaining preeminence in reverse gear construction as build-ers of marine transmissions.

In order to counteract the tendency of rising manufacturing costs, and in order to be in a position to supply maximum gear value at a minimum price, the former line of Paragon Reverse Gears known as the Slide Operating Type has been dropped. The Yoke Operating Type, the newer model which has enjoyed immense popularity among engine builders, is now the only type of Paragon which is manufactured.

In addition to this fewer sizes are manufactured than were

In addition to this fewer sizes are manufactured than were being built two years ago.

Richard Wastcoat, President of the Paragon Gear Works, in discussing the subject with the Editor, says: "In order to eventually meet this logical demand, we have taken steps mentioned above as an effort to reduce manufacturing costs by the elimination of the Slide Operating Type and thus concentrating our efforts entirely to the Yoke Operating Type, and by the further elimination of one or two intermediary sizes, we hope to be able eventually to pass on to our customers the saving hope to be able eventually to pass on to our customers the saving manufacturing costs which, we trust, will be accomplished. 'It is unfortunate," he said, "that buyers in their demand for

price reduction, do not realize that prices of marine power plants and other devices in the marine line were not guilty of the price inflation which has characterized so many products. It is interesting, for example, to note the comparatively small price in-creases that have been obtained in the marine line as against, for example, the far greater price increases of the automobile

kindred lines

"The buyer of things marine has been able to secure for his money much more than can be obtained in hardly any other

mechanical line.

"We may be pardoned if we consider ourselves more or less of an accurate barometer of the Marine Trade, coming in con-tact, as we do, with the majority of marine engine builders. From this standpoint of ours we feel that the marine industry will enjoy next spring an excellent demand. The gasoline and kerosene propelled workboat has proved its value too convincingly to be subject to the curtailment to which many other products may be subject. The American-made marine motor has forced its way so firmly into foreign markets that we believe will enjoy an unprecedented export demand as soon as the Foreign Exchange situation clears itself, so that the purchasing power of foreign money is brought more clearly to its pre-war

The company is represented by Richard Wastcoat, President; Ralph Thompson, Sales Manager; C. J. Robertson, Mechanical Engineer; and H. F. Baker, Service Department.

### Consolidated Shows Model of Plant

The Consolidated Shipbuilding Corporation, Morris Heights, New York City, one of the oldest exhibitors, have an exceptionally attractive display at their space A-2 and A-3.

A new Florida fishing boat design 36' 6" in length is the feature of their exhibit. This design has just been brought out by the Consolidated builders. In this length, 36' 6", the designers and builders have demonstrated skill in producing an ideal Florida Cruiser as well as a fishing boat de luxe combination. bination.

The extensive plant of the Consolidated Shipbuilding Corporation, located at Morris Heights, New York City, where hulls, steel and wood, steam engines, boilers and gasoline engines are manufactured, is rendered in model by a noted model maker in New York City. This also forms a part of their exhibit. The model measures 5 feet in length, 3 feet wide and is enclosed in a plate glass case. Those visitors of the Show who have never viewed the works of the Consolidated people at Morris Height will have an approximative of visualization the scane of Heights, will have an opportunity of visualizing the scope of their organization. The model has been rendered exceptionally well and proves an interesting feature. Several stock boats, runabouts and tenders also are shown.

Several stock boats, runabouts and tenders also are shown. The well-known Speedway engines, of which the Consolidated are the designers and builders, are no less prominent than in

former years.

### Joes Reverse Gears

Joes Famous Reverse Gears are on exhibition at the Palace Show in spaces 67-69, Mezzanine.

The unprecedented interest in oil-burning motors for workboats proves one of the strongest features of this Show, because of its recent rapid development and the promising outlook for a much larger field for these motors in the future.

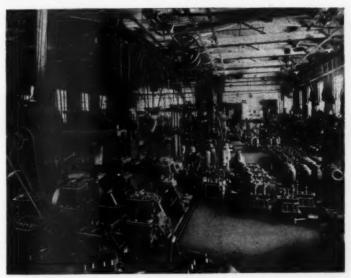
An electrically driven large size Husky is installed in their booth to attract motor builders as well as engineers operating this class of power. The Husky was designed not only to have the requisite strength and durability, but to be universally adapted to all motors with the least modifications, and to make it quick and simple to install or remove.

The Reverse Speed Ratio of the Husky is 85% of the forward speed. It is unnecessary to dwell upon the importance of this high reverse ratio for slow running motors in heavy

In addition to the Husky is exhibited Joes Duplex Drive Gear, which also has a reverse speed ratio of 88% and is a popular and standard product of this company for the past ten years, and is made in sizes suitable for transmitting 2 H.P. per 100 R.P.M. up to a size suitable for transmitting 25 H.P. per 100 R.P.M.

Also Joes High Power Gear, which is particularly adapted to medium and high speed motors ranging from ½ H.P. per 100 R.P.M. to 2½ H.P. per 100 R.P.M. and its compactness, strength, efficiency, durability, and comparatively low cost place it in a class by itself for this class of work. Manufacturers of these small motors in quantity find this gear splendidly educated to their needs. adapted to their needs.

Joes Safety Rear Starters and One-way Clutches are also important and popular products of this company.



The enlarged shop at Hartford, Conn., where the Gray & Prior Motors are built

### R. W. Zundel Co., Inc.

As usual, the R. W. Zundel Co., of New York, occupy a double space directly in front of the Forty-fifth Street side elevators. Their leading feature is a special marine horn for which they are exclusive agents in this territory. This horn has a loud deep tone, uses a minimum of electric current and is weather and waterproof. Lighting outfits are, as usual, strongly featured. They have a complete outfit in operation and are glad to give any information requested. Blood's Universal Joints, one of the highest-grade joints for marine use on the market, are also on highest-grade joints for marine use on the market, are also on display. Khotal stoves, Red Spot, searchlights, sailing lights, barometers, compasses and binnacles are also part of their

### Robertson Lubricants

The main feature of the Robertson Lubricants Company's exhibit is "The Proof of the Pudding," and consists of the 250 h.p. Van Blerck motor belonging in Mr. Louis H. Eisenlohr's Nymph. This motor is shown in the exact condition in which it was removed from the boat after a hard season's running, it shows the carbon which is there in minimum quantities, the spark plugs in perfect condition, the valves in perfect condition, the rings entirely free in their grooves and the bearings in perfect shape.

### C. A. Woolsey Paints

The C. A. Woolsey Paint & Color Company's exhibit especially features with color cards and display signs the various products in the marine paint line that they manufacture. They lay particular stress on their copper paints, Yacht Whites, Adamant Deck Paint, Engine Enamels, Best Spar and Sparon Varnish, also Boat Seam Compound. Mr. P. Varley, sales manager, is in charge of the booth with assistants.

### Regal Gasoline Motors

The Regal Gasoline Engine Co., of Coldwater, Mich., are exhibiting the following marine motors: A 30 h.p. EC four-cylinder engine, jump spark double ignition by Bosch ignition and Atwater-Kent distributor; an 18 h.p. J.B. engine, two cylinder, jump-spark ignition by Bosch magneto with impulse starter; a 20 h.p. UC four-cylinder engine, jump-spark ignition by Bosch magneto with impulse starter; a 14 h.p. EB two-cylinder engine, jump-spark ignition by Bosch magneto with impulse starter; a 10 h.p. UC two-cylinder engine, jump-spark ignition by Bosch magneto with impulse starter; a 10 h.p. UC two-cylinder engine, jump-spark ignition by Bosch magneto with impulse starter and a 2 h.p. model Y engine, one-cylinder, jump-spark ignition by Bosch magneto. They are also exhibiting 34 K.W. Regalite Electric Lighting Plant.

Luders 50-Footer

The Luders Marine Const. Co., of Stamford, Conn., is showing an attractive 50-footer of the concave V-bottom type. The boat is arranged with a forecastle forward with conveniences for the crew a larger watertight cockpit for the guests, an engine compartment in which are installed two of the new dual-valve Sterling engines, a cabin abaft the engine-room and a large cockpit at the stern of the vessel. Features of the construction are the disappearing glass windshield and sliding awning for the forward cockpit and the electric charging set, which is independent of the main motors. Shelter is provided in the cabin for half a dozen persons and additional guests may be accommodated in the cockpit in complete protection from the weather. To insure stiffness, the boat is double planked with mahogany and braced with about 120 pairs of frames. The trim of the craft is genuine India teak. A speed of 35 m.p.h. boat is arranged with a forecastle forward with conveniences

### Carlyle Johnson Reverse Gears

Pioneers in reverse gear designing and staunch proponents of the best in reverse gear construction, the Carlyle Johnson Machine Company, of Manchester, Connecticut, are as usual exhibiting Johnson Marine Reverse Gears at the New York Show this year, never yet having failed to put in appearance just as regularly as Show time came around.

In 1904, when Motor Boat Shows first became the order of the day, there came down from Connecticut an interesting exhibit not much in point of size and rather crude, measured by present-day standards. But motor craft and engines were not then in their present high state of perfection and the Johnson Marine Reverse Gear, as it was in 1904, was a real innovation and it attracted no end of interest.

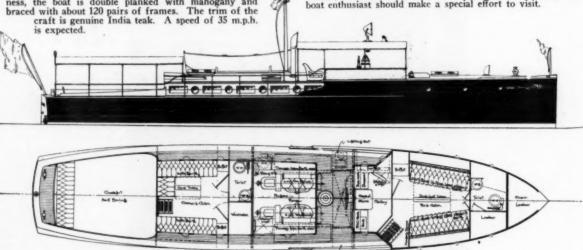
Two gears were placed on exhibition in this first Show, representing the first model ever marketed by the Carlyle Johnson Machine Company. The design of these gears was a distinct improvement over anything previously offered, and carried the unique feature of being entirely enclosed. The illustration shows what was then the height of perfection in reverse gear construction. It must be admitted that in outward appearance this original Johnson model left much to be desired. But many of those who followed the game in the early days of the New York Show will remember the boat White Fox, and how a Johnson Reverse Gear drove her around with amazing speed on the miniature lake in Madison Square Garden. This was the first public performance of the Johnson Gear and it won a lot of admiration that not only created a volume of sales but did much toward placing the idea of a reverse gear in popular favor. The gear had real stuff in it, and it is interesting to note that many of this old model are still doing heroic service

today.

With the rapid progress that ensued in the motor boat industry during the years immediately following, the Johnson Gear went through a series of refinements. While adhering to the fundamental principles as brought out in the original model, the Carlyle Johnson Machine Company introduced additional features from time to time, each constituting a distinct improvement in design, and each being well in advance of the practice of the day. The adoption of hardened nickel steel in gears and shafts was one of the presently imposations. This allowed as shafts was one of the noteworthy innovations. This allowed a great reduction in the weight and bulk of the gear without sacrificing strength or durability. It has proved to be thoroughly good practice and has remained in use to this day.

Another of the big achievements which has kept this Company in the forefront of reverse gear progress was the bringing out in 1914 of the Model "F" Ball Bearing Johnson Gear, which model combined the rear thrust bearing with the reverse gear, all within the enclosed casing, and still small in size and light in weight. Radial ball bearings were also placed in each end of the gear and the whole device was so completely and carefully planned that it has remained in production without further change since that time. New sizes have been added, but they have been based on exactly the same principles, and this model produced six years ago still answers the most modern requirements.

The Model "F" Johnson Ball Bearing Marine Reverse Gear is on exhibit this year in Block K, on the main floor of the Palace, and should certainly be one display which every motor boat enthusiast should make a special effort to visit.



56-foot High-speed Luders designed express cruiser equipped with a pair of 6-cylinder Van Blerck motors of 150 h. p.

### Hall-Scott Marine Engines

Hall-Scott marine engines are shown in Space N this year, which is an exclusive little "niche" located all by itself over on the northwest corner of the building.

the northwest corner of the building.

As in other years, only stock motors will be shown, the Hall-Scott Company believing that the public will appreciate the superiority of Hall-Scott workmanship without the need of special Show finish. In addition to the regular stock engines



Clarie, the 35-foot Hutchinson Bros. designed and built runabout which made such a fine impression at Toronto

in the four cylinder 125 H.P. and six cylinder 200 H.P. sizes, they will also exhibit both four and six cylinder airplane engines to better illustrate the vast difference between this type and the regular marine engine. There will also be a number of Hall-Scott parts taken from regular stock to better illustrate the extremely high quality of workmanship and the close attention to detail which so distinguishes Hall-Scott engines.

The exhibit is in charge of Mr. A. J. Utz, Manager of the Eastern Sales & Service Branch of the Hall-Scott Motor Car Co., at Buffalo, N. Y., assisted by Mr. John G. Robinson, Publicity Representative, and one of the executives from the factory at Berkeley, Calif.

at Berkeley, Calif.

Winton Marine Engines

The Winton Engine Works' exhibit this year is highly in ane winton Engine Works' exhibit this year is highly interesting to boat owners and prospective engine buyers. It consists of three complete units, a Model W-5, 125 H.P., six-cylinder gasoline marine engine, a Model W-2 Generating Set, and a Model 85 Water and Air Pump.

The high quality characteristic of all Winton gasoline marine engines—the result of broad experience and ample facilities—is apparent in the trim design and compact construction of these three units.

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The Model W-5 Winton gasoline marine motor has six 8-inch x 11-inch cylinders and is rated at 125 h.p. Crankshaft diameter, 3½ inch; main end bearing, 3½ inch x 9 inch; interior bearing, 3½ inch x 5½ inch; connecting rod bearing, 3½ inch x 4½ inch; speed range, 100-450; weight, 10,000 lbs.

Cylinders are cast in pairs, made of special grade gray iron. Jackets are easily cleaned. Cylinders are bored and ground to assure perfectly round holes.

Pistons are exceptionally long, made of special grade gray iron, ground to size, beautifully finished, and fitted with three rings.

Crankshaft is a high carbon open-hearth steel forging. Bearings ground and finished until hard and absolutely smooth. Crankshaft is exceptionally heavy.

Connecting rods are drop-forgings. Made of high-grade carbon steel with an H section.

Large valve stems conduct heat away from the unusually large nickel steel heads.

Large diameter valve lifters. Fitted with hardened steel roll-

ers with adjustable stems and lock nuts. Patented feature eliminates all valve clatter and pound.

All crankshaft and crank-pin bearings are babbitt-lined brass All camshaft and piston-pin bearings are hard phosphor

bronze of ample size.

Pump pressure supplies oil to every working part of Winton gasoline marine engines. Pump receives oil supply from base. All main crankshaft bearings and pins are lubricated through oil duct bored and drilled in crankshaft. No splash system. Oil filtered each time before circulating through the engine. Oil pressure is regulated by operator. Oil gauge shows pressure at all times. Oil filter is a series of screens, which are readily removable.

Winton special planetary type reverse gear. Unusually large, with expanding ring clutches on the go-ahead side, operating in opposite directions. All gears and pinions are chrome vanadium steel. Shafts, flanges, and gears are forged integral. No keys

or pins.

Manifolds cast integral with cylinders.

Winton air starter-an exclusive feature. Positive; eliminates

cranking. Starts engine and puts it at your disposal in thirty seconds.

Equipment includes carburetor, Bosch coil, Bosch magneto, magneto and battery current, one additional high-tension magneto working on high-tension plugs, giving two systems of ignition, air starter and counter, oiling system, reverse gear, muffler, obless, plugs, teacher, plugs, teacher, plugs, teacher, and resolution, and the sand resolution system, reverse gear, muffler, and the sand resolution counters to show one resolution. cables, plugs, tools, and revolution counter to show operator r.p.m. of engine at all times.

r.p.m. of engine at all times.

Winton Generating Set, Model W-2. Pleasing in appearance and highly efficient. Six 3-inch x 4-inch cylinders; 7½ KW. Imperial generator, 1200 r.p.m.; 110 volts. Also supplied in four cylinders, 5 KW. size.

Winton Air and Water Pump, Model 85. Practically noiseless. Economical in pumping water out of boat and supplying air pressure for starting the engine and blowing whistle. Imperial Motor, 1½ h.p. at 1500 r.p.m.; ¾ h.p. at 700 r.p.m. Air pump displaces two cubic feet of free air per minute at 700 r.p.m. Water and air pump operate separately.

### Elco Exhibit

The Elco Works, of Bayonne, N. J., have their usual handsome and comprehensive exhibit. The exhibit consists of the famous 32-foot Cruisette, 1921 model. This boat has proved to be the most satisfactory little cruiser ever produced. They are 33 feet length overall, 8 feet 6 inches beam and 33 inches draft. They are equipped with a 4-cylinder J. V. B. engine developing 40 horsepower, which gives the boat a speed of 12 miles an hour. The 40-foot Cruisette. This boat is designed similar to the 32-foot Cruisette but has additional accommodations. A very spacious galley is forward and aft is a very large and comfortable saloon with full headroom. Four berths can be arranged in this saloon. The 40 h.p. J. V. B. engine is located under a bridge and the engine-room also provides good sleeping accommodations for one man. Aft is a large and comfortable stateroom with two berths, dresser, and a good size lavatory adjacent. The New Type 30-foot Elco Express. This is a very comfortable boat having 6 feet beam and is suitable for use on any

The New Type 30-100t Elco Express. This is a very com-fortable boat having 6 feet beam and is suitable for use on any body of water. It is equipped with a J. V. B. engine developing 66 horsepower and gives the boat a speed of 21 miles. The New 36-foot Elco Express. This new Express retains all the beauty of lines, construction and detail of its predecessors

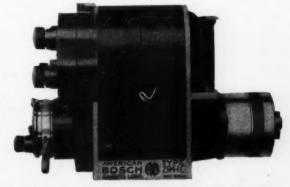
and, in addition, is very considerably larger in beam and mould—the beam being 6 feet 6 inches.

Equipped with the 6-cylinder Sterling GR engine, developing

225 horsepower, this new Elco Express has a speed of 32 miles an hour.

Bosch Magnetos

An unusually attractive exhibit of Bosch products occupies space 90. All magnetos of standard make are on display, each mounted on an attractive show stand and wired to spark plugs. The centerpiece of the exhibit is a huge reproduction of the Bosch spark plug, which sparks at regular intervals by the aid of electrical equipment. The new Bosch starting motors and lighting generators, which have created considerable interest among manufacturers of motors and automotive equipment, are also on exhibition. The newest thing in Bosch products is the Bosch Adjustable Impulse Coupling, which is being studied very closely by motor boat enthusiasts. This is one of the leading features of their exhibit.



The latest model Bosch magneto displayed in Space 90

### Bowler, Holmes & Hecker Co. Show Universal Motors

Bowler, Holmes & Hecker Co. have their exhibit in Block K on the main floor of the Show and exhibit five different types of Universal Marine Motors and three different types of Universal Marine Electric Generating Sets.

## What Do You Expect for Your Money?

By A. S. Hyde

Sales Manager, Caille Perfection Motor Co.

THEN you invest your good money in a marine motor what do you expect for it?

Service.

Nothing but service. Service in length of time the motor will keep functioning. Service in the consistent work of the motor. Service from the manufacturer when you have the misfortune to damage your engine.

When you buy a marine motor you don't buy just a number of iron, steel and aluminum castings, brass parts and lengths of wire. You buy something far more human, you buy the service which goes with that engine.

The demand from the marine motor manufacturer and dealer is service of varying kinds. You

expect both to give you good, reliable advice on the kind of a power plant for your hull. If you are putting a kicker on a rowboat, which is to be used when you fish among the weeds, you expect the man who sells you the little motor to sell you a motor you can use for that particular purpose. If you are buying a motor for a boat of considerable displacement, which is supposed to make the outside passage to Florida about the first of January, you expect the seller to sell you a motor which is designed exactly for that purpose, and that has the power to drive your boat safely along in spite of high winds and baby typhoons.

You have the right to expect that service from the man who sells you your motor. If you meet a man who tries to sell you a certain motor just because it is the only type of motor he has to sell, and who is determined to sell that motor regardless of whether it is the best motor for you, you are dealing with a fool or a crook-a man who should

be kicked out of the marine business.

But you must do your share to get the right kind of ser-If you are pig-headed and insist on the manufacturer or dealer selling you the engine you want, you must be prepared to take the sole responsibility if you are not satisfied. If you insist that you want a ten horsepower motor with battery ignition and no reverse gear, it is your fault if you have too little power, if you are caught miles out from harbor with a weakening spark, or if you neatly knock the end off a wharf because you underestimated your speed. To get the service you require you must make the man you buy from your marine doctor.

Fortunately the marine motor industry is full of "bugs." The man who sells you a motor may be as crazy, or a little crazier than you about motor boating, and he has usually had more experience because he has sold such a widely

differing clientele of boat owners.

After you have your engine you expect the best of service in the replacement of parts. You want replacement parts quick. Every dealer and every manufacturer realizes the fact. Yet sometimes you think the act of getting parts reveals more dumbness than you had ever imagined existed in any person or organization.

What you really need is a parts depot in all the large boating centers. The manufacturer should have parts or service departments in New York, Boston, Baltimore, Norfolk, Charleston, Tampa or Jacksonville, New Orleans, Dallas or Galveston, Los Angeles, San Francisco, Port-land, Seattle, Chicago, St. Louis. If he does a world-wide business he should have replacements at all the commercial centers.

Frequently this is not the case and you have to send direct to the factory for spare parts. One reason has been that for the past four years no manufacturer has been able to keep

MoToR BoatinG has always preached quality. It believes that as a rule marine engines are reliable. But it knows that there are thousands of unreliable motors built every year and offered for sale to would-be motor boatmen by the builders. We have over 500 names of engine manufacturers on our list. Hardly 10 per cent of these can be called reliable. The remainder build something not suitable for use in boats. Their products may be cheap in price, but they are useless in quality also. Therefore do not be deceived. Be careful from whom you buy. Consult authoritative advice if you are in doubt. Don't let low price or fictitious claims influence you. Real marine motors cost money simply because they are worth it.

Mr. Hyde's article is an excellent one and

Mr. Hyde's article is an excellent one and to the point. We recommend that every motor boatman read it.—EDITOR.

even enough parts to build new engines. It's a waste of valuable paper to recite the troubles of all manufacturers for four years, but everyone knows that material and labor have been scarce, with the result that it has been impossible to keep supplies of engines and parts with various dealers.

Now to get your parts-and to

get them quickly.

Every marine motor manufacturer knows how important it is for his customers to have quick service on parts. Yet how many users think the manufacturer is deliberately delaying parts orders? You must bear in mind the difficulties under which the manufacturer operates. It is a forces are usually cut down in the fall and increased in the

spring. All the business comes at once, which means inevitable confusion. Orders for parts are not clear. The progress of the gasoline engine industry has meant changes from time to time and the exhaust manifold for a twelve horsepower engine, 1912 model, is not interchangeable with the manifold of the 1918 model. It's a credit to good manufacturers that engines of the 1910 vintage are still in use, giving as good service to the owner as the latest model. When you order parts you will be helping yourself by giving an accurate description of your engine and ordering from a parts list. If you have no parts list-get one. Don't put your boat in the water each spring without sending to the motor manufacturer for a parts list. It saves time and

trouble ultimately.

Don't have hysteria when your parts don't arrive omptly. Consider the mail and express service. The promptly. Amercian Railway Express Co. is horribly inefficient and apparently totally indifferent at times. The delays in delivery and losses of shipments are appalling. A recent instance coming to my attention was a shipment by express, going sixty miles on a through line, took eight days for delivery at destination. The post office has been nearly ruined by labor conditions of the past few years. Many people lay the blame to Postmaster General Burleson, which is as foolish as it is ridiculous. The Postmaster General is as little responsible as you are. Some of the responsibility lies with Congress, which has failed to increase the salaries of post office employees to living wage. It will take ten years for the mail service to get back to its former efficiency. As a result, parcel post is slow and uncertain. All the fault does not lie in the factory of the marine motor manufacturer.

But for the most important service of all.

The service you receive from your marine motor. How are you to assure yourself that you are getting a motor that is right? How do you know the motor will give you long service? How do you know you will be able to get replacements when you want them?

That's up to you-up to your horse-sense.

If you are going to buy your motor solely on account of price you will be stung. Stung just as you are when you buy any article that is cheap.

You must buy your motor for its quality and not for its Buy from a reliable manufacturer. The best way to

select a reliable marine motor is to go through the advertising columns of MoToR BoatinG in an issue ten years old, then go through the advertising columns of this issue. The manufacturers who were advertising ten years ago and are advertising now are mighty sure to be reliable, to be

(Continued on page 154)

## Building Motor Boats from the Knock-Down

SOON after the advent of the motor boat, some thirty years ago, the knock-down was put on the market. As the popular size of the motor boat increased, with the improvement in the combustion engine, the knock-down industry kept pace. It has undergone a steady development until today can be purchased a knock-down motor boat 70 ft. in length from a strictly standard hull design, or a motor boat of any greater length according to specification and special contract.

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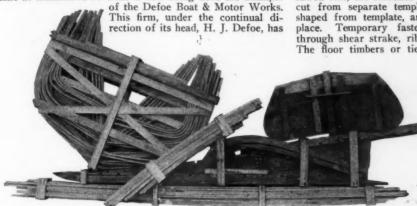
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Of the long list of manufacturers of knock-down boats that have arisen during this period of development we may take as illustrative of what is now being done the example



Frame for a 25-foot cruiser crated for shipment

consistently and insistently made the knock-down boat its specialty for twenty years, and is now beginning to offer to the trade knock-down boats in larger sizes than ever before, in steel and in composite steel and wood.

First, as to the company's present practice in the field of wooden boats. Sixty standard hull designs are kept in its pattern rooms in the form of full-sized templates for the various parts of the framework. Many of these designs



A completed 38-footer built from knock-down

are for cabin boats, and while numerous cabin arrangements are offered for each model, the arrangement to be used with any particular hull design is left entirely open to customer. Customer may select an arrangement from a sheet of suggestions for cabin plans, or may work out an arrangement for any model to suit himself. He has the same privilege of specifying relative lengths of decks and cockpits and other features of arrangement in the case of open boats, and is allowed a great deal of latitude in the case of any standard design as to how and where he will install power plant, any installation being provided for by properly pitching and boring of shaft log, etc., in laying out the frame from templates.

The method of constructing a knock-down

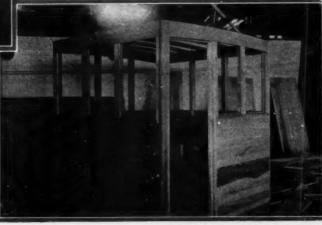
order is in general as follows: Keel, stem, transom or stern post are shaped and fastened together with necessary knees and deadwoods to form the backbone of the boat, the standard templates being used for the purpose. The backbone is next set on keel blocks and plumbed to position, and first the mould-ribs are erected. These mould-ribs are stayed to their exact shapes and are tied across the top by rigid cross-pawls. Around these mould-ribs, when duly plumbed to position at the stations marked on keel, ribbands are bent. The remaining ribs, usually steam bent, are then fitted to the ribbands. Where the boat is built with sawed ribs, the ribbands are not necessary, as all ribs are cut from separate templates. Next the shear strake is shaped from template, and the shear clamp is sprung to place. Temporary fastenings are then put into place through shear strake, rib and clamp, from stem to stern. The floor timbers or tie-pieces' are fitted to tie the ribs

across the keel. The deck beams are fitted to place and fastened. And then are worked out the stanchions, stringers and carlines constituting the framework of the cabin shell to accommodate the interior arrangement customer has specified.

Now if only the K.-D. frame has been ordered, these parts, while still fastened in position, are marked and numbered in accordance with an instruction sheet covering general re-erection of frames. If other materials for completing the boat are required, still further work

may have to be done on the frame while thus erected. Planking does not have to be fitted to it, for that is cut from templates correctly made when the design was first worked out. If decking is required the necessary amount is carefully measured and crated.

Decking is not fitted as to length but is dressed to even widths, with or without caulking seam as required, and usually with a V-bead on the underside for finish. If cabin joinery is required, the water tables, coamings and pilasters are exactly fitted and permanently fastened to framework of cabin except at the corners, only temporary fastenings being used at corners so that the sides can later be taken apart and boxed up as solid, intact pieces. Floor stringers and beams are fitted, and the panelled bulkheads and partitions are made up to fit their various positions. These panelled pieces are permanently put together, section by section, to be boxed and shipped in their finished form, ready to be put into place when boat is re-erected by customer.



Pilot house for a freighter to be shipped in four sections as part of a knock-down boat



Bow of a 38-foot V-Bottom frame marked and ready to be taken apart for shipment

Seats and berths are in most cases not actually erected in the knock-down boat, but while the boat is erected on factory floor, accurate measurements are taken for the material, and it is entirely milled out, and each piece marked for its proper use. Whatever is required in panelled seat fronts, however, and in panels and stiles for casing in the spaces between windows and seat tops is finished as to widths and moulded patterns, so that only the fine jointing at the ends has to be done by customer in installing it.

Furniture is made up to fit its positions, if desired. And if awnings and pipe rails are desired, manufacturer erects and fits them complete after he has laid for customer the

cover boards and otherwise completed the hull and cabin work on which they will have to rest. And whatever is required in paints and varnishes can be closely estimated for any job, after the work has proceeded thus far, and necesary kinds and amounts furnished with remainder of the shipment.

Thus the knock-down industry has proceeded to such a point that it is furnishing to customers in the field of wooden boats for either pleasure or commerce not merely knock-down frames, but complete knock-down boats. Hull design is standardized, but cabin and deck arrangement is left open to customer in case of any standardized hull design, and all finishing materials depending upon the arrangement used must be figured and priced after this arrangement has been settled between manufacturer and client, either by client's sketching out his own preference and having it checked and verified by manufacturer, or else by client's selecting a plan submitted by manufacturer.

else by client's selecting a plan submitted by manufacturer. So far as the market for knock-down boats is concerned, it is world-wide, and steadily increasing in its intensity. Men of means and with ready access to the complete boat market, often buy the knock-down boat in order to have it put together under their own eyes. They get the satisfaction of seeing every piece of material placed in it in its raw, unpainted condition, merely supervising the erection and finishing while they hire an experienced mechanic to do the actual work. Others of less means, who feel that they cannot afford to pay the price of a finished boat such as they want, build from knock-down primarily to cash in on their own time and effort. And still other firms and individuals buy knock-down boats because of the facility with which they can be transported to inaceessible places, such as inland lakes and rivers and to harbors and ports on the frontiers of civilization; for them the purchase of a complete boat is impossible, as in most cases they require large sized boats for freighting, passenger, ferry or fishing purposes, which cannot be transported by rail or on steamer deck.

In the steel and composite boats of larger sizes it is expected to cater to a market that is still developing with the aid of the crude oil engine—a market for craft that lie between the commonly termed motor boat and the bona



A 35' x 8' 3" cruiser built from knockdown

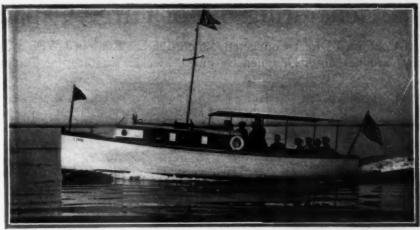
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Frame of a 40-footer in the builder's shop, ready to be taken apart and shipped to the purchaser

fide ship. Boats of the size implied will fill an important demand on the part of summer and mountain resort firms requiring passenger and ferry boats and sometimes small freighters, which cannot possibly be transported overland in completed form.



The 32-foot Elco Cruisette underway

# Standardizing the Standardized Boat

Why It Is That the Elco Company Has Made Such a Success with Their Cruisette—Plans For Building in Great Quantity in 1921

THERE is perhaps, no greater fallacy than the idea that an absolutely successful motor boat can be built on the first attempt. By this is not meant the first attempt of a new plant, but the initial effort in behalf of some one individual. In the whole history of the industry it is doubtful if a single boat was ever built that met all of the requirements of the man for whom it was constructed, or that gave satisfactory service in every particular, or in which changes of one sort or another were not necessary after the

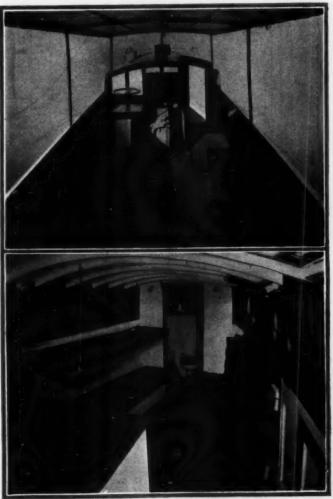
craft was put into operation.

This is no reflection on the boat-building industry individually or collectively, rather is it due to the human equation, for the man has never lived yet who could conceive in his own mind a project of intricacy and transmit it to another individual and enable that second individual to visualize it just as the first man has pictured it to himself. Thus, it has been that motor boat after motor boat has been "custom built" only to be altered afterward to such an extent that the craft was hardly recognizable, or innumerable changes, which may not have altered the appearance, but which were none the less expensive, bothersome and time-consuming have been made—and always buyers and builders have sought for some plan whereby these changes which cost money and loss of good will could be eliminated, or failing in that, at least held down to a minimum.

It was from this condition that the standardized motor boat has been evolved, a craft designed to embody features that will please the greatest number of motor boat owners, and at the same time enable the prospective motor boat purchaser to have the "goods wrapped up and take them home with him," and finally, to include all of the improvements that the building of scores of motor boats have shown are desirable and prac-

ticable.

The war exerted a potent influence on the standardization of motor boats, for it was from the construction of the Motor Launches and Submarine Chasers by the Eleo Works of the Electric Boat Company, at Bayonne, New Jersey, that the idea of standardization and quantity production for peacetime motor pleasure and commercial craft took root. Thus it was, that (Continued on page 152)



Two views of the Elco Cruisette. The upper view shows the large cockpit looking forward, and the lower illustration gives one an idea of the accommodations below decks

# Small Generating Set of Large Capacity

A Self-Contained Direct-Connected Generating Set Equipped With a Two-Cycle Gasoline Motor Designed by Smith-Meeker Engineering Company

AT last we have a small direct connected gasoline driven generating unit which has been especially designed by the Smith-Meeker Engineering Co. to fill the long-felt need of a small portable and reliable light and power plant. Motor boating has long needed a machine of this

type ever since electric lights and electric starters became a necessary part of boating equipment. The complete plant which is on display at Spaces 30 and 31 weighs less than one hundred pounds, not including storage battery. A handle is conveniently provided, so that the entire unit can be lifted and carried by one man. The design of the unit is very compact, and all the material that enters into its construction has been selected with the view of not only making the plant as light as possible but also maintains a sturdiness of construction that will ensure a long life of reliable service.

This plant will be cheap enough so that every man can afford one and still be good enough and powerful enough to take care of the requirements of the finest type of speed boat or cruiser up to about 50 feet. The engine is a single cylinder, two-cycle and air-cooled and develops approximately one and one-quarter horsepower under normal running conditions. The piston and connecting rod are of a special aluminum alloy, assuring lightness and great strength.

A Zenith carbureter, especially designed for this engine to give maximum fuel economy, is used. This carbureter is of the well known fixed jet construction, requiring no adjustment after leaving the factory. Ignition is taken care of by the high grade Simms magneto, the magneto being driven directly from the power shaft. The generator is mounted on the front end of the frame of the plant, and the armature is connected directly to the crank shaft of the

engine, so that every ounce of energy is efficiently utilized besides making the simplest arrangement. A fan of grey cast iron is mounted on the shaft between the crank and the generator armature. This construction permits the climination of an extra flywheel. A hollow cylindrical fuel tank is mounted around the generator, which gives the plant a neat, compact appearance. The tank has a capacity of three and one-half quarts, which furnishes enough fuel to the engine for six hours' running, or sufficient to recharge the battery when completely run down. The generator is a six-pole shunt-wound machine—12-18 volt—and its capplant. 'is generously in excess of the requirements of the plant.

The capacity is at least one-half k.w. and the units are built in every voltage from six to thirty-two. Every man that operates a boat has gone out and stepped on his starter when the motor was cold and run his battery down. In the more modern type of boat there is no way to crank the engine that is practical for the owner.

Therefore, it means taking the battery out, sending it ashore and having it recharged, which means that the boat cannot be used until this is finished. This little plant avoids all this trouble, it saves the battery, as it can always be kept fully charged and assures the owner that his engine will always start, provided other things are in order.

Outside of the motor boat field, think of the sailing vessels and fishing boats that now burn oil that can have electricity for a song. Then there is the question of unloading from boats and barges at points where electric lights are not readily available,

or for transferring cargoes in harbors, etc. There are also the possibilities of the Portable Plant in making repairs to vessels of all kinds either at sea or otherwise.

The new

Homelite

generat-

ing set has a ca-

pacity of 1/2 Kw.

The Steam Boat Inspection Act calls for emergency lights on certain types of vessels. The law is now so broad that candles can be used, but no self-respecting Steam Boat Line would use candles if they could purchase a plant at a reasonable price and have same installed without any difficulty.

Among the numerous uses for Homelite plants

are:

1. Charging of starting and lighting batteries in cabin cruisers up to fiftyfoot in length. Operating incandescent searchlights and small bilge pumps. Lighting of sailing vessels and fishing boats. Portable Portable lighting for the unloading of cargo vessels and barges. Portable lighting for making repairs in vessels where electric current is not ava lable.



# Cyrene—A Sixty-one Foot Motor House Yacht

A Happy Combination of the Famous Fifty-two and Eighty-foot Houseboats Built by Mathis

This boat is 61 feet over all, with 16-foot beam and draws 3 feet, 6 inches of water. She is a combination of the 80-foot and 52-foot houseboats originated last year by this buildcr, retaining all the comfor; of the larger size boat with a distinct lowering of the cost of operation

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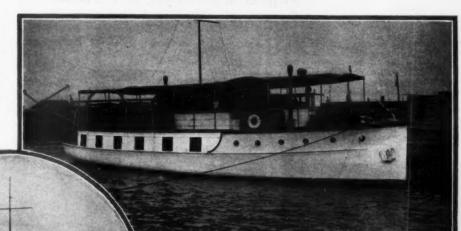
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On deck she is equipped with enclosed steering quarters, a large roomy deck-house with observation windows and a large afterdeck on the outboard side of which she carries two boats



The motive power is supplied by a six-cylinder 70-90 H. P. Standard engine with which the boat is comfortably able to make between 11 and 12 miles an hour. A separate electric lighting plant and storage batteries, an electric-driven pump for shower bath in owner's quarters and complete hotwater heating system complete the equipment





The double stateroom. A Passageway runs aft connecting with two other staterooms, a complete bath room and a toilet room. In each of these two staterooms Pullman berths have been installed, so that six persons in all can sleep comfortably in the three staterooms. Forward from the saloon on the starboard side is the galley—fitted up combletely—and containing an extremely large ice box properly ventilated overhead with combination hatch

The deck-house is fitted up with furniture of the latest design, chosen especially for its deep, resilient, comfort-giving upholstery. The interior finish is in keeping with the motif of luxurious comfort, the exquisite mahogany paneling and the capped deck beams adding especially to the general effect



# Columbian Bronze Executives

Progressive Leaders of the Famous Propeller Manufacturing Firm Who Are Responsible For Its Rapid Growth

THE exhibit of the Columbian Bronze Corporation is especially interesting this year to motor boat owners, as a new style Columbian Propeller is being displayed for the first time. This is known as the Style "J" Columbian Liberty Propeller. This propeller is intended for high-power, high-speed engines and has been so designed as to embody the great strength required for this service without sacrificing speed. This problem, which has been bothering propeller manufacturers for years, has at last been solved.

This latest innovation is in line with the aggressive progress of this corporation, which has marked its growth from a small

industry. During this period he has seen the maximum speed of boats increase from 15 miles per hour to the present time, when we are talking 90 miles and expect to get it. Mr. Patrick is responsible for some of the propellers on the fastest boats in the world and the new Style "J" Columbian Liberty Propeller is his latest creation. It has been tried on several of the fast ones this past season. He is a member of the American Institute of Metals and is well and widely known as a representative man of this industry.

man of this industry.

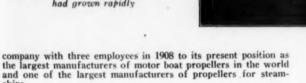
Mr. Wilbur H. Young graduated from the University of Georgia as an electrical engineer and followed that line with the Pullman Company, the New York Edison Company and others until 1910, when he organized and became president of the Gasoline Engine Equipment Company, which concern started as pioneers in the development of motor boating in the New York district. Mr. Young was instrumental in developing the direct-connected gasoline electric generating units and during the war designed and perfected a number of special devices



Louis J. Hall, President, under whose leadership the business of the Columbian Bronze Corporation had grown rapidly



Robert A. Patrick, Secretary and Plant Manager, is responsible for some of the propellers used on the fastest boats in the world



ships.

This substantial progress is due to the efforts of the President, Mr. Louis J. Hall, and the Secretary and Plant Manager, Mr. Robert A. Patrick, who have been greatly aided by the Vice-President, Mr. Wilbur H. Young, recently added to the manage-

Mr. Louis J. Hall, who was educated in Cornell University as mechanical engineer, has been president of the corporation since 1908. He has been responsible for the development of the finances and sales of the corporation and other matters pertaining to the business management. Under his direction the volume\_of sales has steadily increased from year to year, the business has grown and the products of the corporation, especially in the line of Columbian propellers and other bronze castings for marine use, have gained favorable recognition in the maritime world and obtained an ever-widening market. Mr. Hall adds to commercial experience the advantage of technical knowledge. He is a member of the American Society of Mechanical Engineers and of the American Institute of Metals.

Mr. Patrick was born in Hamilton, Ontario, educated in the Hamilton Public Schools and Rochester Business University. He started the Columbian Brass Foundry in Brooklyn in 1901, moved to Freeport and started making propellers as a specialty in 1905, incorporating in 1907. He has been in charge of the plant for nineteen years, and having made a special study of the propulsion of power boats for the past fifteen years, has been responsible for a great many improvements in the motor boat



Wilbur H. Young, Vice-President, perfected a number of special devices during the war

along this line for the United States War and Navy Departments and for several of the foreign allied governments.

The exhibit is in Block "L" on the Lexington Avenue side of

The exhibit is in Block "L" on the Lexington Avenue side of the Palace and is made up of their usual line of Columbian Propellers and Accessories attractively mounted and illuminated. The qualities of speed and balance in these propellers are especially featured.

Special provision for the accommodation of out-of-town friends has been made for those who desire to make this exhibit their headquarters while visiting the Show. An invitation is also extended to visit the executive offices of this corporation, located at 522 Fifth Avenue, corner of 44th Street, which is very convenient to the Grand Central Palace. Telephone and stenographers are provided for friends desiring to make use of same.

# The New Knox 20 H. P. Marine Motor

### Specifications of Structural Features of the Latest Model to Be Produced by Knox Motors Associates

YLINDERS are produced of material especially prepared for this purpose. They are east in block, rough bored, and allowed to season before being finally finished. The water jacket is very liberal and is designed to eliminate all possibility of steam pockets. The entire interior of the combustion chambers is machined, eliminating variations and making possible a smooth-running motor. For the same reason carbon can be cleaned out

rouning motor. For the same reason can be cleaned out more thoroughly and with more ease than on other types.

Cylinder Head is removable and is fastened to the cylinder proper by means of a number of heat-treated studs providing for drawing the head down uniformly upon a copper-asbestos gasket to prevent leakage. The head is completely water jack-eted, allowing the water to circulate around the valves. It can readily removed, allowing for inspection, cleaning out carbon

Crankcase is made of a high grade material which our long experience has found best suited to marine work. The walls of the case are carried high and also well below the center-line of the case are carried high and also well below the center-line of the motor, providing a depth of case giving maximum strength and rigidity. The bottom is covered with a stamping thoroughly enameled, which serves as an oil pan and carries a large oil screen. The hand-hole covers fitted to the side of the case are of such size as to allow easy access to the connecting rods and bearings.

bearings.

Crankshaft is of the three bearing type, drop forged of highgrade steel and carefully heat treated. All bearings are ground
to size. The shaft is very large for the size of motor, insuring
great strength, rigidity and freedom from vibration.

Connecting Rods are drop forged from
alloy steel, heat-treated, and are designed
to give a maximum of strength with a
minimum of weight. The wrist-pin and
crank-pin ends of the connecting rods

crank-pin ends of the connecting rods are machined to a predetermined weight so as to insure their being in perfect balwith each other.

Pistons are extra long, made of high-grade metal, accurately fitted with three rings and highly finished. Relief holes are drilled in the pistons to drain the excess oil from the cylinder back into the crankcase. The four pistons each motor are carefully

matched for weight.

Piston Pins are tubular type and large in diameter, giving the maximum bear-ing area at this point. Their pistons and they are held fast in the rod. They can not get loose,

work endwise, and score the cylinder.

Bearings. All main and connecting rod bearings are bronze shell, babbitt lined, fitted with babbitt-faced laminum shims, and are extra large for this size motor. They are accurately reamed and broached to fit. They have no longitudinal oil groove to collect the diet and consider the hose of the collection. to collect the dirt and scratch the shaft.

to collect the dirt and scratch the shaft.

Camshaft is forged in one piece and is case hardened on bearings and face of cams. The cams and timing-gear flange are integral with the shaft. This design insures uniformity of timing, as all cams are ground from a master shaft.

Timing Gears are in the rear end of the crankcase and are of special design and shape of teeth. Great care is taken in the

machining of these gears, assuring practically noiseless operation at all speeds. They are thoroughly lubricated by pressure feed

Valve Mechanism. Overhead valves were in the first Knox motors built and have been a Knox standard ever since. This is one of the reasons for the efficiency of Knox motors. They are, we believe, the only motors on the market which have back of them so long experience with overhead valves. In this model the valve design is developed to the highest efficiency yet at-In this model

The removable cylinder head is cast in block, all valves being scated directly in the casting. This allows the maximum amount of water to circulate around the valves and much more closely than would be the case if cages were used. The valves are of ample size and are made from material which our experience has shown best adapted for the purpose. There are no threaded adjustments to the valves to get loose and cause damage. Each valve stem has a specially designed cap, within which will be found a number of shims to provide adjustment. This method

of adjustment has been thoroughly tried out and found much more lasting and permanent than the thread method.

The entire valve mechanism is enclosed and operated by a single camshaft. The rocker arms are of drop forged, high grade alloy steel and oscillate on a hardened tube through which oil is forced so that the whole mechanism is under pressure lubrication. The center of the rocker arm is offset and with the peculiar shape of cam gives a quicker opening and a longer dwell than is the case with the ordinary cam and the roller type of plunger.

Extremely long valve guides and valve stems are used, pro-viding large wearing surfaces with long life to these parts. This construction eliminates unevenness in the motor when

this construction chimitates in the motor when throttling down after the motor has seen long service.

Oiling System is the full pressure, internal feed type which has been so successfully used in Knox motors since the inception of the Knox four-cylinder motor in 1906. Oil is carried under full pressure to all bearings, including the reverse gear rear and thrust bearings, rocker arm shaft, circulating and bilge

pumps and to the interior of the reverse gear itself.

Intake Manifold is cast directly into and becomes a part of the cylinder head. The passages are surrounded by the circuthe cylinder head. The passages are surrounded by the circulating water which thoroughly warms the incoming charge. This method has been found to produce better results in marine work than the so-called "hot spot" manifold. The carburetor is bolted directly to the cylinder head casting.

Exhaust Manifold is a water jacketed casting bolted to the cylinder head and is cooled by the incoming circulating water. The rear end of the exhaust manifold is flanged and to it is bolted a separate flange threaded to take the exhaust pipe. This construction allows

take the exhaust pipe. This construction allows for the ready removal of the exhaust pipe when rusted from long service, without destroying the manifold itself.

Cooling System. The circulating system is somewhat of a departure from the general prac-

tice now in use in marine motors. The water, after being drawn through the bottom of the boat, passes through the circulating pump directly to the under side of the exhaust manifold. It is forced around the water jacket of the exhaust manifold and is taken off at the top, thus eliminating all possibility of steam pockets. It then enters the cylinder water jacket at its lowest point, passing upward through the jackets and out at the cylinder head. This method not only cools the exhaust manifold but warms the

water before entering the cylinder will run at a more even temperature jackets so that the engine than is usually the case when cold water is pumped directly to the cylinder jackets.

Circulating and Bilge Pumps are in unit construction but are absolutely separate in operation. They are of the gear type, bronze gears being used. The bilge pump can be run or not as the operator desires and may be thrown into operation with the

motor running.

Ignition is by high tension magneto with impulse starter. gives ease of starting by hand, together with efficient and

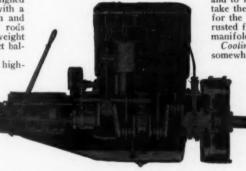
reliable ignition.

Starter. Provision is made for electric starter and generator, the attachment flanges and units used being S. A. E. standard. The user can, by exchanging the flywheel, install electric starter and generator at any time he desires, or it can be applied at the factory before the motor is shipped. By the use of these standard dimensioned units service on electrical apparatus may be obtained at any time at the accessory manufacturer's service extrices throughout the country.

stations throughout the country.

Stuffing Box on the end of the reverse gear case keeps the oil in and the water out. This is a feature which has been much off in and the water out. This is a feature which has been much neglected heretofore in marine motor construction and is at this time included in but a few of the very high-powered and most expensive motors built. A standard make of reverse gear drilled for pressure lubrication to Knox specifications is used. This gear is totally enclosed and lubricated by oil from the main pressure oiling system. The reverse gear case cover is exceptionally large, allowing ease of adjustment of the gear. The case is so designed that the reverse gear can be removed without disturbing the motor proper.

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Sectional view of the new Knox 20 h.p. marine motor

# The Value of Varnish in Preserving Bright Work

By Amos Bissell, President Bissel Varnish Co.

(Successors to David B. Crockett Co.)

### Proper Methods of Finishing Bright Work

Varnishing should be done in a warm room, if possible; if not, a warm day should be chosen which will help the varnish to work more easily, flow more freely and dry without dust more quickly. The surfaces should be protected from the direct rays of the sun while the varnish is drying to prevent unnecessary thinning of

the film and blistering.

A clean brush should be used and the surface to be finished should be free from dust and lint. A rag should never be used for wiping the dust from the surface of the wood; use a painter's dusting brush or any clean bristle brush. A coating of varnish, properly applied, is never 1/100th of an inch in thickness when dry and it is a very small particle of dust, indeed, which will not look like a small mountain in the smooth gloss film. If you feel that you must use a rag for dusting, use a chamois skin, or as lintless a rag as you can find slightly moistened with Spar Varnish thinned down with turpentine half-and-

Revarnishing Old Work. old varnish is badly perished and offers little or no protection to the wood it should be removed with a good varnish remover which should be freely applied with a bristle brush, stroking one way always. Allow this to soak into the coating well. Do not try to scrape off-then apply another coat of remover and when this has softened the varnish to the bottom of the coatings rub the surface hard with a piece of old burlap or some coarse cloth. If this does not wipe off every trace of the old finish, apply another coat of remover, allow it to soften the film, and rub off again. If this does not clean it thoroughly, wet the surface again with remover, and rub lightly with fine steel wool. By no means gouge into the coating with a putty knife for it will leave marks in the surface which will be leave marks in the survive leave leave marks in the survive leave lea worth several times its cost. When the wood is absolutely clean, wash and scrub the surface with gasoline, using a stiff brush which will remove all traces of remover and prevent any tendency which it always has of preventing the proper hardening of finishes applied over it. Then rub down the surface with fine steel wool, or with Garnet, Sand or Carborundum Steel wool cuts fastest but you paper. are liable to follow waves in the wood with it and make them worse. Corborundum Paper used over a cork block is best. Dust off carefully with a painter's dusting brush, wash with gasoline again and finish as directed for new work.

If the film is unbroken and is deadened from exposure, rub down with fine steel wool or with 00 sandpaper, dust off and apply a thin coat of Spar Varnish, allow to harden three days; flat the gloss by rubbing the surface with a ball of curled hair and apply a second coat of Varnish using more than for the first coat. Work this out evenly with the brush to insure even drying. If varnish crawls (seems to try to run off from the surface in patches or gathers into little greasy puddles) and the undercoat has been flattened with curled hair, it is usually due to cold, for a chilled varnish sometimes crawls. To prevent this sponge the undercoating with clean, water, and immediately apply the finishing coat over the wet surface. It will not harm the varnish and will stop the crawling usually.

Finishing New Work. If one quart of raw refined linseed oil is thaned with two quarts of gasoline and the can put into a pail of hot water it will make the best primer for wood to be exposed to mois-ture that you can find. This mixture is ap-plied hot to the smoothed woodwork with sponge or a brush, before the filler is ap-lied. It will partially satisfy the suction of the wood and a more lasting finish reyour painter argues too hard against it, better omit this coat. But it is best. If you use it, be sure that the oil is pure, don't use too freely, and wait seven days before applying the next coat of any-thing. Colors may be mixed with it to stain the wood, but don't try to stain the wood over this oil coating for the stain will not take so well. It is sometimes necessary to stain the wood before applying filler. Acid stains are not good for this class of work for one may not depend on a uniform color. Water stains usually fade badly as do most of the oil stains. The best for use on Mahogany are combinations of Burnt Sienna, Van Dyke Brown, Rose Lake and French Carmine ground in linseed oil; for oak, Raw and Burnt Umber, Lamp Black, and Van Dyke Brown are used. Lamp Black makes a cloudy color however, but some use it. These are thinned with turpentine and about 3% of good japan dryer added. They are applied with a brush and the surface is cleaned immediately with a soft cloth. The filler should be applied over the stain for clearest colors.

Many combine the stain and the filler. Any color of filler may be obtained, but desired effects may be obtained by mixing the colors mentioned above with a Natural Color Mineral Paste Filler. Never use a so-called Liquid Filler on boat work-you will be sorry. on such work. It is not intended for use

Over the filler the next coat, on close pored woods, should be a coat of spar varnish thinned with one part of turpentine to two parts of varnish; half and half is still better but it may result in compelling the use of an extra coat to obtain the desired finish. Either coat will strike in and you will regret that you have wasted the time to apply it. But it is in the pores of the wood and will insure a lasting finish. hurried work a waterproof floor finish, thinned in the same way, may be used. Wait for 72 hours for spar varnish, 48 Wait for 72 hours for spar varnish, 40 hours for floor finish to harden before applying the next coat. Rub this over lightly with curled hair, dust off, and apply a second coat of the same material, without the come time to day as thinning. Allow the same time to dry as for first coat. Moss off with the hair again and flow on a finishing coat of Spar Var-nish. It will be ready to use in two days. Some finishers mix the second coat, half-and-half Spar Varnish and waterproof floor finish. This is not bad practice for it tapers off the elasticity of the coatings; this coat should never be applied over a first coat of Spar, however, for it will alligator crack. If used, the first coat should be waterproof floor finish, thinned as stated.

On open pored woods, oak, walnut, ma-hogany, etc., the oil coat should be applied, if desired; then take mineral past filler, thin down to the consistency of cream with turpentine and brush well over a small surface. This will flatten down quickly and as soon as it deadens in drying, take a piece of burlap and rub briskly across the grain of the wood, endeavoring to pad it into its pores. If too large a space is coated before rubbing in, the filler hard and will be removed with difficulty from the surface. If not removed, the finish will be cloudy. On the finest work it is well to use two coats of filler, the first thinned to the consistency of milk with and rubbed off as mentioned before. In 24 hours another coat, thinned to the consistency of cream, is applied and rubbed in as above. This coat should be given 48 hours to harden. It is then smoothed with hours to harden. It is then smoothed with o0 sandpaper, stroking lengthwise of the grain of the wood, and a coat of water-proof floor finish, which has been thinned with an equal part of turpentine, should be applied. This cements the filler into the pores and makes the finish less liable to deaden down because of shrinking of the filler. It supports the succeeding coats of varnish well, also. In 48 hours this should be followed with the same varnishes as described under close pored woods.

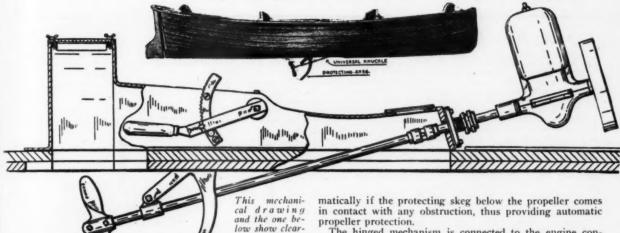
If it is desired, the next to the last coat of varnish may be rubbed with powdered pumice stone and water. A felt pad is used which is kept very wet by soaking it in water and dipping in water frequently. Never use oil and pumice for rubbing; it clouds the finish, for the oil softens the varnish and some of the pumice stone re-mains imbedded in the surface. The surface of the varnish is wetted, is sprinkled with a little powdered pumice stone, the pad is wet, dipped into the pumice and the surface of the varnish is rubbed. Always stroke lengthwise of the grain of the wood. Care should be used not to rub too hard or too long or you will rub through, which will necessitate the use of an extra coat of varnish. Spar Varnish rubs in-differently. It is too gummy and tough. And varnish which rubs well is too hard to be durable upon exposure outdoors. Use waterproof floor finish for a rubbing coat on boat work; this is a compromise and is about halfway between a rubbing and a spar varnish. Don't rub at all if you will be guided by experience. You remove about half of the protection of that coat. Curled hair will cut off the dirt specks and will leave the main body of the varnish

Never use shellac under varnish which is to be exposed to sun or moisture. varnish will not bond properly with it. The varnish will flake off and appear brittle. The reason for it is the shellac. Varnish may blister when applied over Never attempt to apply varnish over a glossy coating, for it is liable to pit or crawl. Always flat the undercoats in one of the ways described in this article.

Use clean cups, clean brushes and keep the surfaces clean. Buy the most durable varnishes you can find, no matter what the price, for the time taken to varnish a boat is worth five to ten times the cost of any varnish used. And if a varnish has twice the durability it is cheap at five times the price per gallon.

# Motor Boating in Shallow Waters

Those Who Live Near Shallow Streams and Bays Can Enjoy Boating in a Real Motor Boat



ly how the en-

tire propeller and shaft moves

provided within the hull of the boat

up into the compartment

HOSE of us who are fortunate enough to live near deep waters and large navigable rivers and lakes do not realize the limitations and difficulties of the motor boat enthusiast who has to accommodate his boating activities and explorations to shallow streams or small lakes, frequently made worse with sunken logs, sand bars, submerged rocks, weeds and other snags. But necessity is the mother of invention and in this case necessity has given us a very practical motor boat that can go anywhere there is water enough to float a row boat.

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Perhaps the best proof of the practical value of the Disappearing Propeller boat is the fact that the company which makes this type, The Disappearing Propeller Boat Company of Toronto, Canada, has sold literally thousands of these boats during the past few seasons, which are now in use on inland waters of Canada, the United States and other countries. In fact, the demand has been so great that the original factory in Canada has been unable to keep up with it and consequently a large United States factory has just been established at the great lumber center of North Tonawanda, N. Y., in addition to a branch at Detroit, Mich.

The principle of the Disappearing Propeller boat is simplicity itself. The propeller and shaft are merely hinged so that they can be moved up into a compartment within the hull of the boat, leaving the keels on as straight as the bottom of a skiff after the propeller is raised. This is done by a control lever inside the boat, and it is also raised auto-

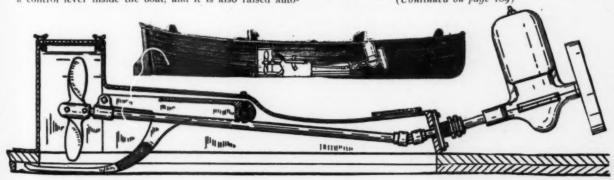
The hinged mechanism is connected to the engine controls so that the engine is throttled down to prevent it from racing as the propeller rises, without attention from the operator. Lifting the propeller control lever automatically controls the speed of both the engine and the boat, giving any speed from the slightest forward movement up to 9½ miles an hour. With the lever up the boat stands still with engine throttled down, acting the same as a one-way clutch.

It is said that the location of the propeller mid-ship stabilizes the boat like a center board on a sailboat, and, furthermore, gives an increase in speed of from 2 to 2½ miles per hour over a stern propeller. While the special features of this boat particularly adapt it for shallow water, an extremely seaworthy model of hull is used and the center board effect of the propeller enables it to ride any sea that any small boat can endure. As an example of the stability, it might be mentioned that many owners use these boats for bathing and they dive off the side of the boat without tipping it dangerously.

Three standard models are produced, giving the advantage of thorough standardization which is so desirable for quantity production. The Uncle Sam model is 18½ ft. long, with 4 ft. 8 in. beam. The John Bull model is 16½ ft. long, with 4 ft. 11 in. beam. The Water-Ford model is 16½ ft. long, with 4 ft. 1 in. beam. All three models have removable seat backs and removable seats and are equipped with a 3 H. P. Silent "Dis-Pro" Motor which weighs only 40 lbs.

The efficiency of these boats can be judged from the fact this little motor drives them 9 to 9½ miles an hour and will take them 20 to 25 miles on a gallon of gasoline. Such mileage per gallon of gasoline will be a surprise to the average boat owner, and the speed is all that can be desired for a boat of this size and purpose.

Not all of the designer's ingenuity has been expended in (Continued on page 189)



THIS is the time of year when the motor boat industry is at its busiest. Strange as it may seem, when all the boats throughout the northern part of the country are laid up for the winter and active yachting is at a standstill, the manufacturers find the orders coming in strongly for new boats, new engines, new clutches and everything new that goes into the boat. The busy motor boatman does not sleep or forget his sport during the winter. He plans improvement to his craft, installs a new motor or repairs the one he has. All parts that need replacement are gone over and this activity is reflected in the hum of the wheels of the motor boat industry.

### Topping Bros. Show Varied Hardware

Topping Brohers, in their booths No. 46 and 48, will display the famous One Way Clutches, which have attracted so much favorable attention. One of them will be featured on a revolving shaft to show actual operation. This clutch has filled a want long felt for a moderate price clutch. The consequent demand has taxed the capacity of the factory during the last year.

Other articles of interest shown by this firm are the All Bronze Adjustable Shaftlogs, easily adjusted to any angle, the Bronze Adjustable Universal Joint with the split collar, and the well known line of Drew's Caulking Tools and Mallets, for which Topping Brothers are the distributers. These tools played their part in the last war, and were found in nearly every shipwhich Topping Brothers are the distributers. These tools played their part in the last war, and were found in nearly every ship-yard doing their bit. A full line of the Barker Motors will be displayed also. The demand for these Motors has steadily increased for the last twenty years.

In line with their policy to present the best possible exhibit, Topping Brothers has spared neither time nor expense in preparing for the Show. Their exhibit has been given added a prominence and interest by their large special insert in the Show.

prominence and interest by their large special insert in the Show number of MoToR Boating.

The exhibit will include all the regular line of Marine Hard-

The samples will ware and equipment with the new products. The samples will be mounted on Yacht White finished display boards with rope frames, and the familiar Topping Brothers panel sign in color

of a docked liner forming the center.

The Galvanized Chain will replace the usual counter and wooden rail, and lighted posts, and palms, will add to the effect. Comfortable wicker chairs will be available for yachtsmen who make this port-of-call.

The growth of this firm has been steady. From a moderate beginning to sales aggregating from four to five millions per year, with a million dollar stock in their New York warehouses,

is the story of Topping Brothers.

In addition to their Warehouses which they already occupy, they have recently obtained a large Warehouse on the New York Dock Company property with a floor space of 40,000 square feet, with their own siding and adjacent to the New York Dock Piers.

When interviewed concerning conditions their Marine Department reported the past season as the largest in their history ment reported the past season as the largest in their history with the demand and interest still continuing. One of their travelling representatives who is at present in Florida and will continue to the Rio Grande, reports that all hands agree that the number of boats south and going south is the greatest ever, and all conditions point to a successful winter and spring boating

### Fisher Trophy is Handsome

The Carl G. Fisher Trophy for the Displacement Boat Championship of North America was raced for last summer at Detroit under the rules of the American Power Boat Association. This cup was the most important and valuable trophy ever offered for a power boat race. At Detroit five boats competed in three fifty-mile heats without repairs or adjustments and perfect scores were made by several. The trophy was won by Rainbow, the property of Commodore H. B. Greening, and powered with a G.R. Sterling motor: Best speed made being 37.2 m.p.h. during the second race. The average for the total race was 36.7. The object of the donor in putting this cup in competition is to encourage the development of high speed power boats which are useful, seaworthy craft and not merely flimsy racing machines. The Carl G. Fisher Trophy for the Displacement Boat Cham-

boats which are useful, seaworthy craft and not merely flimsy racing machines.

The Fisher Trophy is of 14-karat gold and 17 inches high, exclusive of the black ebony base. It is modeled on the graceful lines of the cups of state of the Middle Ages. The cover is surmounted by a correct model of the competing racing craft. The body decoration consists of the laurel of victory and the trident and shells of the sea. The flag of the American Power Boat Association with anchor afoul, enameled in proper colors, is applied to the lower base. Twelve gold shields for inscription of names of yearly winners, are applied to the inscription of names of yearly winners, are applied to the

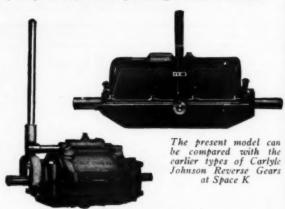
ebony base. The Trophy Department of J. E. Caldwell & Co., has been very carefully developed for designing and making trophies, cups, medals, of finest quality and most original design. They also make special table services of silver, silver plate, crystal and china for use on private yachts.

The races for the next series of races for the Fisher Trophy will be held at Miami, Florida, on February 10th, 11th and 12th,

### Dodge Heavy Oil Motor

At the booth of the Dodge Sales & Engineering Company one can see an example of heavy oil engines as produced in Indiana. The Dodge heavy oil engine is a complete power plant in itself.

The four-cylinder size will develop fifty-horsepower and use only two-thirds as much fuel and one-third as much lubricating oil as other oil engines. The fuel is fed on gravity; no high-pressure injection pump is required or used. The motor starts by compressed air without preheating or electrical devices.



### Safety First!

The National Life Preserver Company, of 11 Broadway, are showing their exhibit in Space 72. Their exhibit includes the famous Ever-Warm Safety-Suit in various sizes—for men, women, and children—on life-size models, and young men and women give actual demonstrations of putting on the suit in less

women, and children—on life-size models, and young men and women give actual demonstrations of putting on the suit in less than a minute.

The suit is shown in detail also, with the patent closure and self-adjusting elastic collar which makes the suit absolutely watertight. The Kapok pads or lining, which gives it the remarkable buoyancy that enables the wearer to help rescue several other persons. This is the suit's remarkable margin of safety. An illustration of the buoyancy, an actual water test, will be carried on throughout the week.

There are official records and illustrative proof of the approval by the U. S. Navy and the suit's use by thousands in the United States and in foreign countries, and data on the lives saved in actual sea disasters, such as that of the S. S. President Lincoln, Aurania, and many others. They show also that the suit appeals to yachtsmen, fishermen and mariners in general. The Ever-Warm Safety Suit, as is generally known, is a garment made with shoes and mittens, all in one piece, completely enclosing the body in a watertight suit.

Representatives in charge: Andrew E. Puckrin, J. E. Jackson, P. D. Corbitt, O. F. Kaiet, A. M. Lundberg, Philip Weisbrot, J. White, Mr. O. A. Youngren, president (and the inventor) will also attend.

### Toppan Dories

The Toppan Boat Mfg. Co., of Medford, Mass.,

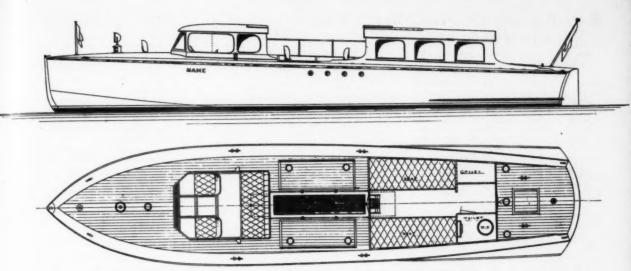
The Toppan Boat Mtg. Co., of Medford, Mass., are exhibiting one 22-foot Toppan dory launch equipped with 9-12 h.p. Universal four-cylinder four-cycle motor. This boat carries 12 to 15 people comfortably and is a fine rough water boat.

One 21 x 5 foot V-Bottom mahogany trimmed Runabout, equipped with 12-14 h.p. Kermath motor, with reverse gear, magneto, and a boat that will give 15 miles per hour. It carries six people, has automobile arrangements of seats, auto steering wheel and all controls are from the bulkhead. It is circular to wheel, and all controls are from the bulkhead. It is similar to the 16-foot hydroplane Bullet which the Toppan Co, have ex-

the 10-toot hydroplane Bullet which the Toppan Co. have exhibited in other Shows, and which attracted such admiration.

One 18-foot Three in One Power Dory equipped with centerboard and sail as auxiliary and with 3 h.p. Barker motor as the regular power. This boat is a very popular one, as it can be rowed, sailed or propelled with power.

One 12-foot Power Yacht Tender equipped with 2 h.p. Barker motor, with three cross seats bright finished, hoisting rings fore and aft, and two pair of brass rowlocks and sockets.



One of the latest designs by Hacker. This attractive high speed cruiser has just been launched by the Hacker Boat Co. Her Hall-Scott motors are capable of driving her at better than 35 m.p.h.

### All Frisbie Motors Are Tested

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One of the few plants in the country which are equipped with a Sprague Elec-tric Dynamometer is at the Frisbie Motor Company, Middletown, Conn. All motors of the larger sizes are thoroughly tested out on this machine and a continuous horse power record is readily available for any purchasers who require it. They are run for one full working day under their own power at light load so that all bearings and surfaces may be well run in before a heavy load is applied. Immebefore a heavy load is applied. Immediately following this the motors are run for another full working day of nine hours under full load and at full speed. All motors during the second day's test must develop under these conditions at least ten are sent more than their rate of least ten per cent more than their rate of horse power. The power output can be very accurately measured by means of the instruments attached to the Sprague instruments attached to Dynamometer and the power produced is absolutely known for each machine. After at test such as this, which is really equiva-lent to about one month's work in the ordinary pleasure boat, it is felt that the motors are ready to be put into actual operation and perform hard work reliably and well.

The Frisbie plant is one of those which is still working to capacity despite the fact that the automotive industry is supposed to be very hard hit for business. They are operating on a nine-hour day,

fifty hours a week and for eight months past the machine shop has been running double shifts and the assembly bays an average of 75 to 80 hours a week. The mechanics employed in the Frisbie plant are all good old Connecticut Yankees who have been machinists all of their lives, following their fathers before them. This is a shop in which there never has This is a shop in which there never has been any labor trouble and in which the spirit of the slogan of the Friendly Frisbie amily is carried out to the utmost.

### Seaman-Salesman Novelty in Business Field

The good yacht Champion, with Capt. Clay O'Dell, salesman, in charge, and Navigator Miksch at the helm, is working its way down the Atlantic coast to Florida, on another leg of a trip that is unique in the annals of maritime and commercial development in this country.

The Champion, a 30-foot cabin-cruiser, powered by a gasoline motor, is the property of the Champion Spark Plug Company, of Toledo, Ohio. The ship is cruising the inland waters and along the coast, righten mand waters and along the coast, visiting the principal ports, spreading Champion Spark Plugs on the seas in the same manner that Champion salesmen are spreading the fame of this world leader in

spark plugs on land. The Champion has been in commission only a few months. But already Capt. O'Dell and his craft, which is capable of good speed, have covered practically every port on Long Island Sound, up the Hud-son River, through the Erie Canal to Buffalo and along the shores of Lake Erie as far as Detroit, and back to Toledo,

Then, to escape the lakes for the winter Then, to escape the lakes for the winter season, when navigation is closed, Capt. O'Dell started southward with his crew. They returned over the route by which they came to Detroit, and are working down the coast to Florida. In these and neighboring waters they will spend the winter months and then start for northern territory, comin

capt. O'Dell and his crew call upon ship chandlers, yacht clubs and marine engine builders. Living on the yacht, they have the additional advantage of being able

the additional advantage of being able to take prospective buyers aboard the boat and give practical demonstrations of Champion Spark Plugs.

Already the venture has justified the judgment of the Champion Spark Plug Company. It is furnishing a marine supply service that is appreciated by dealers in ship supplies, marine engines and other products.

### Beautiful Cassonia II

Among the most striking and attractive of the large motor yachts in Chicago waters is Cassonia II, the handsome 60-footer here illustrated, which is owned by F. P. Choate, of that city.

Cassonia II is a big heavy boat drawing 4 feet 8 inches of water and has 12 feet 6 inches beam. She is finely finished and richly appointed and is in service practically all of the time during the open season and she is cabined and weather makes little and she is cabined and weather makes little difference to her owner. Her power plant consists of two Model F 28-36 H.P. Red consists of two Model F 28-30 H.P. Red Wing Thorobred marine motors, equipped with 12-yolt 2 unit electric starters. These motors are of the detachable head type. Her speed is 12 miles an hour and she easily makes 10 and 11 mile on long cruises. Mr. Choate, her owner, is en-thusiastic over her power plant. "I have thusiastic over her power plant. "I have never had a moment's trouble with her motors," he says, "and they are absolutely

motors," he says, "and they are absolutely first class in every way."

The installation of Thorobreds in this big boat is very interesting and shows the Thorobred to be a motor of many uses. It is used in speed work, in fast runabouts, work boats and all manner of crafts, and it develops that the Thorobred is equally on the job when it comes to pleasing the owner of a hig motor wach. owner of a big motor yacht.



Cassonia II, the sixty-foot cruiser, owned by F. P. Choate of Chicago, is equipped with two model F Red Wing Thorobred motors

# Handle Hall-Scotts

Arrangements have been made whereby the Rapp-Huckins Co., Inc., of 59 Haver-hill St., Boston, Mass., well-known marine engine dealers, will act as New England distributors for Hall-Scott marine engines.

These engines, which are built by the Hall-Scott Motor Car Co., Inc., of Berkeley, Calif., are handled in the Eastern States by the Eastern Sales & Service Branch of that company, 39 Associated Service Building, Buffalo, N. Y., where a large stock of engines and spare parts is always on hand ready for immediate delivery.

Hall-Scott marine engines have already made a decided impression on the enthusi asts around Boston through the splendid performances of Wild Cat, a 30-foot run-about built by the E. G. Black Yacht Works, of Marblehead, Mass., for W. T. Mann, of Magnolia Beach. This snappy Mann, of Magnolia Beach. This snappy little craft is powered with a six-cylinder 200 h.p. Hall-Scott and is said to be the fastest runabout on the New England Coast, \* having repeatedly demonstrated close to 40 miles an hour.

In other parts of the country Hall-Scott particles were been search.

marine engines have been equally successful, and are rapidly forging to the front as the most popular power plant for fast runabouts and express cruisers. It is an actual fact that in the most important re-gattas held this year from coast to coast Hall-Scott powered boats outnumbered all competitors in the displacement runabout classes, indicating in a most decided man-ner the approval of the motor boating

public. The wide experience of the Hall-Scott engineering staff has enabled them to pro-duce an engine which, although of much lighter weight than any other marine engine of anywhere nearly equal power, com-bines with this very important advantage exceptional strength and long life. features have been attained through en-gineering skill in the selection of materials of the highest quality, together with the proper treatment of these materials through special processes discovered and developed in the famous Hall-Scott testing laboratories. The successful combination of unusual power and reliability with light weight makes Hall-Scott marine en-gines particularly suitable for the re-powering of well-designed hulls when greater speed and reliability are desired without the addition of extra weight and the sacri-

fice of sea-going qualities which the add-ing of extra weight would entail. The Rapp-Huckins Co. has recently The Rapp-Huckins Co. has recently taken delivery of a six-cylinder 200 h.p. Hall-Scott marine engine which is now on display in their showrooms for the benefit of intending purchasers of this type of engine who may not be familiar with the many superior points of Hall-Scotts.

### Filter Your Gas

What troubles are you having with your urburetors? Isn't it largely caused by get and water from gasoline? carburetors?

dirt and water from gasoline? There is a time-tried proverb: foolish operator ever touches a carburetor -this, because there is little to get out of order on a carburetor except foreign sub-stance changing the adjustment. To get perfect carburetion, you should filter your gasoline through a Gas-co-lator. It will mean more power, more mileage, and a sweeter running motor.

Sold under a guarantee of absolute sat-

For complete data and information write the Visible Gasoline Filter Company, 1426 South Wabash Ave., Chicago, Illinois.

### Rapp-Huckins Co., Inc., State Engineer Tells Waterway Men of Barge Canal Needs

In addressing the New York State /aterways Association at its annual con-Waterways Association at its annual convention in Buffalo, State Engineer Frank M. Williams, of New York, said:

"There is no question more pressing at this time than that of transportation. The growth of our cities demands an ever-increasing supply of raw materials and foodstuffs, but during the past two or three years we have often seen our transportation facilities nearly broken down and our press has often called to mind the danger imminent to our cities through failure to receive the products of the western agri-cultural lands. If this country is to pro-gress, if our cities are to grow, we must have adequate transit facilities. This does not simply mean that rail lines be im-proved, but it means that our waterways

should be used. In this connection it may be well to point out that water transportation is the cheapest form of transportation known. In 1919 it cost \$3.90 to ship one ton of steel from Buffalo to New York by rail, whereas by water the cost was \$2.50, or a differential of \$1.40 in favor of the Barge Canal. It would, accordingly, seem that water shipments would be the first to come to the minds of traffic managers, yet men are not thinking of sending goods by inland water routes, except in the Upper Great Lakes region. This is due to the truth that a generation ago many of our waterways, for one reason or another, fell into ill-repute, and to bring men of this generation back to think in terms of barges and shipping goods by water is no easy task, and it takes a great deal of argument to move men out of their accustomed ways. They have been shipping by rail so long that they fail to realize the saving they would make by using the canal rather than the rail lines. It requires a bold step on the part of business men to do the thing that they are not in the habit of doing, yet they would be money ahead if they would

ship by water.
"The new and improved Barge Canal has been in successful operation for nearly three years and we are constantly receiv-ing testimonials of its practicability from many sources. The usual idea of the Barge Canal is that it is only adapted for the movement of low-grade freight, such as grain and coal. This should no longer prevail, for fleets are crossing the State and being unloaded at their destination faster than ordinary shipments are going by rail. This is due to the improved chan-nel and public terminals, and together these give a service parallel to that af-forded by the railroads in all essential particulars."

Navy Recommends Flyosan

The Colonial Chemical Company, of Reading, Pa., manufacturers of Flyosan, are meeting with excellent success in the marine field. Flyosan is being used by the navy in combating insects, also by many large shipping companies. We are in-formed that it is positive in its action. Flyosan can be sprayed upon clothing, etc., without harm. It is odorless, non-poisonous and a sure insect killer.

Bruns, Kimball's Blue Book

The Murray & Tregurtha Corp. have selected as the eastern distributors of their engines Bruns, Kimball & Co., 153 West 15th Street, New York City. The addition of this splendid motor to the list of engines sold by this company means that boatmen in New York and vicinity will be able to see the machine on display at the company's showroom, and also that owners placing orders for this machine through Bruns, Kimball & Co. will have the advantage of their entire organization is cathing second delivery experies. in getting prompt delivery, service, etc.

The complete Bruns, Kimball line is the blue book of marine engines. The finest made in the country are sold by them and models of those listed always on display in their showroom:

Sterling, Kermath, Missouri, Wolverine, Doman, Murray & Tregurtha, Peerless, Arrow, Gray-Prior, Hartford.

Considering their stock of over two hundred (200) guaranteed rebuilt motors of all sizes and makes, it is possible to equip motor boats of any size or type without delay.

### Comet Magnetos

After many years of experience the Comet Magneto, as built by the Comet Electric Company of Indianapolis, Indiana, has reached a high degree of perfection. These direct current magnetos are furnished for the use of stationary and marine power plants and their circumstances. and marine power plants and their sim-plicity, mechanical design and electrical efficiency cannot be equaled. The number of parts entering into the construction of the magnetos has been kept down to a very small number with obvious advan-tages in construction.

The growth of the field for electric light and power on yachts has brought out the necessity for a generator to meet the particular requirements of this class of service. Comet generators have been designed particularly to fill this need and their rugged construction insures long life and maximum efficiency.

# Sterling Brings Out New

These engines are a modification of the well-known overhead dual valve Sterlings, in that they employ three valves in the de-tachable cylinder head instead of four. This arrangement makes it possible to get both arrangement makes it possible to get both intake and exhaust passages on one side of the engine. The intake and exhaust manifolds are bolted together and there is a provision for hot spots in the intake manifold, one of which is directly above the carburetor and all incoming gasoline must strike against this spot. The compression is directly lower than the bigh. pression is slightly lower than the high-speed motors to make these engines more suitable for the heavier type of boat.

These engines are built especially to burn the lower grades of fuel now on the market. Sterling Engineers have thought it advisable to change their design completely rather than to attempt to utilize any pre-heating device to facilitate combustion.

These engines are guaranteed to be capable of throttling to 300 revolutions in a boat under load, and we can actually throttle them to between 200 and 250 revolutions, at which speeds they hit perfectly. This makes them suitable for trolling, while, on the other hand, when wide open the power is well above the average and the fuel consumption is much lower. The fuel consumption with these engines is guaranteed at .65 lbs. per B. H. P. hour, while the consumption of engines is guaranteed at .65 lbs. per B. H. P. hour, while the consumption of previous motors, and in fact the average consumption, is guaranteed at about .75

### The Latest Sea Sleds

The motor boat owner who is interested in speed types probably realizes by this time that the possibilities in high-speed boats have been pretty well revolutionized since the close of the war, by the introduction of two or three improved types of high-speed engines, which have been more or less bred of the exigencies of war time. I refer particularly to such engines as the Hall-Scott type LM, the Sterling Model GR and the Murray & Tregurtha Models I and K. It is no exaggeration to say that these engines have opened up a complete new field of enjoyment for the lover of high speed motor boats-and, after all, the high-speed boat furnishes the prime sensation among all outdoor sports.

Boat designers and the enthusiasts who have followed the game closely, understand that up until the close of the war Sea Sled development followed practically only one line that resulted in the production of high-speed boats having a length of about four beams, and in which speed and extreme seaworthiness were the prime considerations, coupled, as in the case of the 32-footer, with great carrying capacity at high speed in rough water, these little boats having shown their ability to maintain planing speeds in the open ocean with as many as thirty-four men aboard and without having to stagger under the load. By contrast with other planing boats, this sort of performance would seem to be incredible; but the boat worked very well under these conditions. In our later work, to put the novelty of idea briefly, we came to see that there was no reason why Sea Sled principles should not be applied throughout a development which would follow very closely the development of Vbottom and round-bottom boats. And we have made a number of experiments with Sea Sleds that have been lengthened out and have had their bottoms modified, so that they might run efficiently at all speeds down to the lowest.

The first of the so-called displacement Sea Sleds showed some defects, but in many respects was a remarkable boat. This boat was 29 feet by 5 feet 6 inches beam, and of the slow-speed non-planing Messrs. Hartshorn and MacRae, of the Sea Sled Company, took her out in an easterly blow and found that she was a fine sea boat, very soft in a head sea and showing the uncanny ability of the planing Sea Sled to stay on her feet in a beam or in a quartering sea and without any tendency to yaw or root in a following sea. The general development along this line is promising, the boat showing the great stability of the Sea Sled both at rest and at speed, beside being dry and very easy in a seaway.

Among the planing boats, the development is also of some interest. In one or two of the earlier planing type Sleds we increased the length over the normal length-beam ratio and found that these boats got out into planing position very readily, bridged the seas easily and generally were "softer" boats for pleasure purposes with very little, if any, loss of speed. This started us in the direction of lengthening out the high-speed Sea Sled and developing a boat with proportions somewhat corresponding with those of the present day high-speed V-bottom run-about. These boats, with their added

"softness" of performance, still show the Sea Sled advantages—no spray thrown out at the sides, relatively enormous planing ability and the stability in rough water that is peculiar to the Sea Sled. The first that is peculiar to the Sea Sled. that is peculiar to the Sea Sled. The first Sea Sled to be fitted with a pair of 6-cyl-inder Hall-Scott motors had 6 feet 6 inches beam and a length of 26 feet, while the present hull, especially designed for these motors, has a beam of 6 feet 9 inches and a length of 30 feet, with a moderate re-verse sheer and a pleasing deck line. These boats have a speed around 45 statute miles per hour. At the present time we miles per hour. At the present time we are getting out a similar design to suit a pair of Model GR-6 Sterling engines.

The upshot of all this is that Sea Sled principles—parallel topsides, inverted Vprinciples—parallel topsides, inverted vibottom sections, surface propellers, etc., are being applied in classes of motor boats, high and low speed, which are gradually spreading out to cover the whole field, and to us, who are closely in touch with this development, it seems only to necessities covered design to carry these extubiles. tate sound design to carry these erstwhile speed boats into competition with at least all the lighter type motor boats at present in use.

Among the late models which we have actually put out, two are worth refer-

In one of these we took the standard 32 by 8-foot Navy type and modified various ways into a most comfortable high-speed craft for private service. forward cockpit was fitted up with wide seats with deep spring cushion upholstery, there being three of these seats of full sleeping length. The forward codepin was also fitted with double refrigerators, and with the addition of folding windshield and top made this into a roomy and sheltered compartment. This boat was fitted with a pair of 6-cylinder, Model GR Sterling engines, having a much smaller piston displacement than any engines we had previously installed in boats of this size. In spite of the extra weight of refrigerators, lockers, etc., these en-gines have handled the boat in a most creditable manner. With eight or nine passengers aboard, she will get up into planing position on less than half throttle and has been run frequently under severe weather conditions. The second boat is a new 22 by 5 foot 6 inch with a single 4-cylinder, LM-4 Hall-Scott engine installed. cylinder, LM-4 Hall-Scott engine installed. The first of these 22-foot Sea Sleds had an old type Model C-4 Van Blerck engine and showed remarkable planing ability, having planed easily, first, with three, then with seven passengers, and finally with nine passengers aboard. This new 22footer is not in the water at this time, but should be early in November. The main idea in the development of this size boat is to produce a single engine Sea Sled which will have a moderate cost of up-keep and will be an able seaworthy run-

### New Things in Marine Hardware

Wilcox, Crittenden & Co., Inc., of Middletown, Conn., contemplate a number of additions to their extensive line of marine hardware in the near future.

Three of these new items are now ready for distribution to the trade. Cast iron flange couplings are now a WC product. Their flange couplings are accurately made, and are interchangeable as to shaft within the limits of each size of coupling. For instance, a 1" and 1½" shaft may be coupled by using the No. 1 male bored for one of these sizes and the No. 1 female bored for the other size. To join a 1½" and 1¾" shaft a similar combination of their No. 2 couplings may be used.

The flange couplings are made in two weights. The lighter is suitable for or dinary marine engines, and the heavier is designed for use in connection with heavy duty engines on work boats, etc., where great strength is required. Each coupling is fitted with a standard keyway and set screw.

This company is now ready to supply stern bearings and stuffing boxes with a rectangular base plate fitted with four screw holes. This enables users to fasten the plate of the box or bearing more securely than in the case of ordinary stuffing boxes and stern bearings.

In addition to the well-known line of S. an addition to the well-known line of S. & T. Controls, which Wilcox, Crittenden & Co., Inc., have manufactured for a number of years past, they are now in position to supply the fine line of controls formerly manufactured by the Gray-Hawley Mfg. Co., of Detroit, Mich. These controls are nextly designed and strength. controls are neatly designed and strongly built. They fit closely and the levers do not project, catch on clothing, or cause accidents by suddenly changing the adjust-ment or stopping the motor. This new line is particularly desirable for bulkhead control when the motor is placed under the bridge deck or when the motor is placed forward or when it is necessary to have the controls flat against the bulkhead.

By combining the Gray-Hawley line of controls with those already manufactured by Wilcox, Crittenden & Co., Inc., the latter firm has placed itself in position to take care of every conceivable arrangement of controls from the steering wheel.

### How to Make Your Boat Leakproof

Yes, sir, brother, we've all bailed leaky boats and then some. And, if I am not greatly mistaken, there is going to be a heap of bailing going on just as soon as spring opens up. It is no exaggeration, either, when I predict that, on any midsummer day soon to come, thousands of nimrods all over the country will be at it; ridding their boats of leaky water with old tomato cans, bilge pumps, sponges, gallon buckets and other utensils that may be handy.

Lots of fun, ain't it? Listen: many times have you launched your fishing boat, after its rest of from ten to eleven months, and then watched her go to the bottom? You let her stay there, too, bemonths, and their watered her go to shottom? You let her stay there, too, because she was of absolutely no use until her seams had swelled water-tight. In the meantime, you have lost one, two and more often, three whole days—precious days—'cause it is vacation time. What's worse, though, even then your fishing boat will invariably leak some. No matter how well she is put together, sand, particles of dirt, even ever so small, cannot help but work into her seams. It is these minute particles which no man on earth can wholly keep out of his boat, no matter how the tries, that act as tiny wedges, refusing to allow the seams to swell up and close absolutely watertight. Oh, yes, you can recaulk—overhaul your hull, but that takes time, days when your rod and reel are as much out of commission as if you were back in the city.

Don't you think it is about time to quit Don't you think it is about time to quit juggling with fate, to stop snipping time off the fore end of your annual fishing trip? Yes, to shake loose from the shackles of a dirty, wet fishing boat that calls for plenty of elbow grease to keep from having soaking feet all the time?

Write to L. W. Ferdinand & Co., 152 Kneeland St., Boston, Mass., for information as to making your boat tight.

### The Modern Upholstery for Motor Boats

Everybody agrees that boat upholstery is subjected to the severest possible tests of hard wear and exposure to all sorts of

weather.

When a boat is plunging into head winds, spray from choppy waves often wets the chair seats and cushions on deck and in the cockpit. And people when going aboard motor boats invariably step directly from the dusty wharf upon the seatcushions in the cockpit.

Naturally, manufacturers tried for a number of years to find an economical, wear-resisting, durable and waterproof material for boat upholstery.

Some twenty-odd years ago, as a result of scientific research and experiment, an upholstery material was produced that would withstand the severe usage of boating, and the changing climatic conditions at sea-fog, rain, spray and sun. this material. Chase Leatherwove. first brought to the attention of boat builders and boat owners, it won immediate approval and has steadily gained in favor

until today it is quite generally regarded as the ideal upholstery material for boats. Exacting tests have proved that this un-usually handsome and serviceable material meets every requirement for every kind of boat upholstery—for cockpit, or cabin, for

boat upholstery—tor cockpit, or cabin, for individual chairs, seats, and cushions. Some boat owners use it very effectively as a wall-covering for cabin interiors. It does not crack; it is tough, yet pliable; it does not become mildewed; it is easily cleaned with soap and water; its colors are absolutely fast. These unusual qualities make it the modern upholstery for boats.

Whether for upholstering new boats or re-upholstering old boats, Chase Leatherwove gives a smart, distinctive appearance, wove gives a smart, distinctive appearance, and is an appropriate and practical material. There are several patterns and colors to choose from—the range is from plain black to quaint Spanish effects—in different weights, and color schemes may be easily matched.

Made by L. C. Chase & Company, leaders in manufacturing since 1847, Chase

Leatherwove is nationally recognized as the standard upholstery material of the better kind, because it adds beauty, char-acter, and distinction wherever used. And these qualities plus its durability, pliability, and rich appearance have given Charand rich appearance have given Chase Leatherwove a successful service record of more than twenty years.

### The New Model D-2 Scribbs

For many years past the Scripps Motor Company of Detroit has been an exponent of standardization, concentrating every ef-

fort on one cylinder size, which has been produced in 2-, 4- and 6-cylinder models. During the War period, however, with material difficult to obtain, the 2-cylinder model was temporarily taken from the market in order that better service could be given on the two larger sizes the 4be given on the two larger sizes-the 4-

and 6-cylinder.

Scripps 2-cylinder machines, like the mous Trans-Atlantic model, have given such unusual service in commercial work, in auxiliaries and in the smaller cruisers, that there was an insistent demand among Scripps dealers everywhere, and plans for the resumption of production on the 2-cylinder began right after the Armistice. Particularly in the export field had or-

ders and business piled up. Many cus-tomers, knowing the 2-cylinder Scripps, were willing to wait for it, and as a result

the entire production on this model has been going into the export field for some past.

With increased production the Scripps Motor Company is now able to serve the at-home or domestic trade.

There is a well-developed and well-defined field for this high-class, small engine, retaining all the features that have made the D-4 and the D-6 series so popular during the last three or four years.

has often been remarked by users It has often been remarked by users of small cruisers that there was little choice offered in a high-class, small, medium duty motor between 10 and 20 h.p., and on account of the lack of these it was necessary to fall back on the selection of a small, high speed, 4-cylinder motor. The re-appearance of the D-2 engine fills this demand.

While the D-2 is new in its appearance while the D-2 is new in its appearance to the domestic trade, the motor is in no respect new or experimental. It follows the well-known "D" series, being 4½" bore, 6" stroke, "L" head for cycle type, with the best of everything throughout in motor and equipment. Particular attention is called to the unusually heavy crankshaft (2½" in diameter), bearings in like proportion, lubrication by pressure through drilled crankshaft, oversize Parathrough drilled crankshaft, oversize Parathrough drilled crankshaft, oversize Para-gon reverse gear, high tension magneto ignition, Bosch 2-unit starting and light-ing equipment with Willard storage bat-tery, all going to make up the regular equipment. The pressure lubricating sys-tem also lubricates the reverse gear, a noteworthy feature where motors are in-stalled out of sight, as in auxiliaries. Inasmuch as a motor of this type and size is especially nopular in the commer-

size is especially popular in the commer-cial field, special pains have been taken in the development of a motor that will suc-cessfully handle kerosene. While the encessfully handle kerosene. While the en-gine is offered with gasoline or kerosene equipment optional, there is hardly an perceptible difference in the power output when using the cheaper fuel, while, too, a remarkable range of power control is to be had. For those who desire to troll, a speed range as low as 200 r.p.m. is attain-

The engine is extremely compact, being but 50 inches overall and weighs complete with electric starting and lighting, pounds. Ready accessibility is offered through a large movable hand plate on through a large movable hand plate on the crank case, removable cylinder head and easily accessible reverse gear. No special tools or wrenches are required for a complete takedown. Practically every bolt and nut on the machine can be handled by an ordinary end wrench.

The power range on gasoline runs as follows for the critical process the state of the complex contracts to the contract of the complex contracts to the contract of the contract

follows, for the various motor speeds:

400 R.P.M. 7½ H.P. 500 R.P.M. 10 H.P. 600 R.P.M. 11½ H.P. 700 R.P.M. 11½ H.P. 700 R.P.M. 13½ H.P. 800 R.P.M. 15 H.P. 900 R.P.M. 16½ H.P 1000 R.P.M. 18 H.P.

Full details will be sent to readers of MoToR Boating who address the Scripps Motor Company, 631 Lincoln Ave., Detroit, Mich.

### New Albany-Red Wing Runabout

One of the handsomest and most successful boats offered the public for a long time is the 26-foot fast runabout designed and built by the Albany Boat Corporation.

This craft contains many new and attractive features. It is the latest creation of refined V-bottom type. It is very graceful and is an exceptionally fine handling boat. The builders lay a great deal of stress on the handling qualities of V-bottom boats, and their designer has been most successful with the latest types of rudders. This new boat has a new style of rudder which enables this boat to back and steer almost as easily as it steers in the forward movement; also to turn almost as easily to starboard as to port, and to steer as easily at 2 m.p.h. as at 20 m.p.h. Any experienced owner of a V-bottom boat knows that this is a nice feature to attain.

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By using a motor of just the right weight for the boat they are able to attain a passenger cockpit of very amplé proportions and to have a stylish and neat appearing boat, which satisfies the pride

ownership.

of ownership.

The motor is the famous Red Wing THOROBRED, 40 h.p. unit power plant with reverse gear, made by the Red Wing Motor Co., of Red Wing, Minn. This is a motor which boatmen have loved for its quietness and consistency for many years. This motor drives the above-mentional heat at 20 me h. and all the office. years. This motor drives the above-men-tioned boat at 20 m.p.h., and all the offi-cials of the Albany Boat Corporation are most enthusiastic over the performance of the motor. There are plenty of people who buy fine boats who like to have motors that are quiet and that can be throttled down to very low speed as well as respond smoothly and quickly to an exhilarating speed. Many of the other leading boat builders use this engine, and the Red Wing Company had orders for hundreds of these motors this Fall.

Mr. J. V. Marvin, of Upper St. Regis Lake, in the Adirondacks, recently took his place with an Albany runabout and Red Wing motor in a race where he was badly outclassed for power and speed, but he hung determined to the race with 115 he hung determinedly to the race with 115 and 200 h.p. motors where he was getting the wash badly from other boats passing him, and there have been many favorable comments made on the way this boat han-dled in the wash of boats running at 30 to 35 m.p.h. without losing control. Mr. Marvin has had much pleasure and fun using the boat for family use, and was very much delighted by the way the boat handled when he had her in the race.

### Richardson Boat Company Decide on Two Stock Models

The prospects of the Richardson Boat Co., North Tonawanda, New York, are for one of the biggest seasons ahead since they have been in business. They have re-ceived more real earnest inquiries than they have ever had before at this time of the year. Apparently the public is learning their lesson of ordering early. have decided on two stock models, which they will push the coming season, but they

they will push the coming season, but they will also continue with their regular line of building to order the same as before.

One stock model is an all mahogany high speed runabout about 22 feet long, 5 foot 6 inch beam. The motor it is really being built for is a 4-cylinder high speed model that the Peerless Marine Motor Co. are bringing out, but they will probably leave this optional with the buyer as to the power plant installed. A speed of 35 miles is expected, but the hull is suited for any power of a light weight high speed

The other boat is a 26-foot by 8 foot 6 inches round bilge cruiser, the one designed by Wm. J. Deed. The idea is a strong, substantial boat, not very elaborate, but something that can be built and sold at a rather low price.

The power plant will be a 2-cylinder, 4-cycle, medium duty motor giving a speed of around 9 miles per hour.

### De Forest Radio Co.'s Plant Burns

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0 to The manufacturing plant of the De Forest Radio Company, in 1415 Sedgwick avenue, The Bronx, which makes intricate and delicate instruments for use in wireless telegraphy and wireless telephony, was destroyed by fire on Nov. 19. The flames were discovered in a storeroom by the night watchman, Walter Savill, of 683 Wales avenue, The Bronx. None of the company officials could be located, but workmen at the plant said the loss, owing to the cost of the radio instruments, prob-ably would amount to several hundred thousand dollars.

### Hall-Scott Performances in Cruisers

This season has absolutely proven that it is not necessary to have an engine with a lot of superfluous cast iron to satis-factorily propel moderately heavy cruising

boats.

The following will give an idea of Hall-Scott cruiser installations this year.

Mary K. is a 40' x 9' 6" V bottom fast ferry boat and day cruiser, designed and built by the Hacker Boat Company for John Kunsky of Detroit. Powered with a pair of our sixes this boat has proven herself to be better than a 35 mile an hour outfit.

Myrno III is a 50' x 9' day cruiser, designed and built by the Luders Marine Construction Co., for Norman DeVaux, President of the Chevrolet Motor Co., of San Francisco. This boat is powered with one 6 cylinder Hall-Scott and used on Lake Tahoe 6500 feet altitude. It has a maximum speed of 20 miles an hour.

Myrno II, a 60' express cruiser 10' beam, formerly powered with a pair of 8 cylinder motors of a popular make which were recently replaced with a pair of our sixes, is also owned by Norman DeVaux of San Francisco, and splendid results are being obtained. Incidentally we might mention that Mr. DeVaux first purchased a trunchest powered with one purchased a runabout powered with one of our sixes for use on Lake Tahoe, and he was so immensely pleased with the high grade engine equipment that he immediately placed his order for a six for the day cruiser and now has replaced his 8 cylinder motors with a pair of our sixes for this big boat. He is now the owner of 4 Hall-Scott sixes. This gentleman is personally acquainted with our engineers as well as our plant and equipment and his endorsement of our product is very gratifying.

Vaccum II is a 45' x 10' 4" cruiser 4' draft, It is owned by Webb Jay of Chicago and powered with one of our sixes. Mr. Jay has cruised extensively in this boat this season and has run his motor as high as 18 hours at a time with perfect results. Our engine pushes his boat about 16 miles an hour, and the only parts which Mr. Jay had to purchase this summer were a few small Delco springs.

Miss Snip is a 60' x 11' express cruiser,



Safety-at-Sea. Ever-warm lifesaving suits will keep the wearer warm and dry

owned by J. A. Talbot, President of the Schaw-Batcher Ship Works of San Francisco. This boat is powered with a pair of sixes. On her maiden trip from San Francisco to Los Angeles she became lost in a fog during which the pair of Hall-Scott engines were run 36 hours continuously. The entire outfit has proven a decided success.

Winnifred is an express cruiser 44' long powered with a pair of our sixes, owned by Gilbert Skinner of Skinner & Eddy, Ship Builders of Seattle. The power plant in this boat has proven entirely sat-isfactory giving no trouble whatsoever

Greyhound is a 58' x 10'6" express cruiser 14 tons net displacement, designed by Tams, Lemoine & Crane and owned by Edsel Ford of Detroit, Mich. A pair of our sixes drive this boat slightly better than 26 miles an hour, and the power plant has been entirely satisfactory throughout the season. The Ford Family now own five Hall-Scott sixes.

The season is now over and we are immensely pleased to note that during the entire season Hall-Scott engines have not lost a single bearing, piston, connecting rod, cylinder or any major part. This surely proves that excess iron is not necessary providing that the power plant is turned out by capable engineers, a completely equipped factory and skilled working

### Uncle Sam Selling Transports

Any one desiring to purchase a nice comfortable transport to sail around in can secure a bargain by applying to the U. S. Army Transport Service of Hoboken, N. J. Several of the transports used during the late war are to be sold to the highest bidder. The last day for the receipt of bids will be January 8, 1921.

### New Stock Boats Use Kermath Motors

A new standardized runabout design produced by the John L. Hacker Co., of

Detroit, is being finished with fine mahogany and all other high-class materials including a sixteen h.p. Kermath motor as standard equipment. Another new runabout being built by the Reliance Motor Boat Company, of New York, is one of 21-foot length which is to be equipped with the Vanadium 20 Kermath. This is a real low power Cinderalla type boat built to give remarkable speed and comfort as a family runabout. as a family runabout.

A brand new model Kermath motor is A brand new model Kermath motor is to be ready for the New York Show. This will consist of a two-cylinder 3½-inch bore x 4-inch stroke, and a two-cylinder 3¾-inch bore x 4-inch stroke, listing at \$225 and \$250 respectively. These engines will be two-cylinder sizes corresponding with the 12 h.p. model and 16 h.p. model and will rate at 5 and 8 h.p. respectively. They are of course of the four-cycle type. four-cycle type.

### Notes About the Caille Organization

The following is borrowed from the house organ of the Caille Motor Company, Detroit, Michigan, The Caille Compass which appears now and then and has to do with the personnel of the organiza-

"The principal feature of our organization is the comparative youth of all members. Most of us are in the early prime, with plenty of time and opportunity stretching before us. The average age is not that of untried youth, but a youngness that is tempered with experience and bal-anced by years of discretion.

"Adolph Caille, our president, is a man in middle life. Although he is one of the founders of the company, and the company is ripely aged for an industrial organization, it has not used up all the years of his life, as it is the only business with which he has been connected since boyhood.

"More than twenty years ago, Adolph Caille and his brother, the late A. Arthur Caille, founded our parent corporation, The Caille Brothers Company. The par-ent company was built from the ground ent company was built from the ground up by that arduous process so conspicuous in successful American business—from the room, with both partners doing all the work of designing, manufacturing, selling and financing, to a small shop, to a large shop, to an entire building, and finally to a self-owned building and group of buildings. That has been the progress of the Caille Brothers Company and the Caille Perfection Motor Company."

One of the popular Fay & Bowen Runabouts, a duplicate of which is on exhibition at their Space A1



### Cypress for Boats

One of the most substantial timber species for all marine construction is cypress. This timber, particularly when used for small boat construction, has the facility of not being affected by mosture or other aqueous conditions. It is one of the most durable of woods, light, hard, close grained and easily worked. It takes a high polish and gives a satiny gloss. Its color is a bright clear yellow with nearly white sap wood.

### The Engine of Constant Service

The Buffaloes most used for powering workboats are those of the Heavy Duty type. They are built in nine sizes—two, four and six cylinder designs. All can be operated on kerosene if the necessary equipment is specified. The Buffalo Heavy Duty models are designed to operate at low speed, turning large wheels. All parts are made with ample proportions so that in addition to standing any strain which is likely to come to them, there is a large margin of safety for emergency. They are not needlessly heavy. The aim of their designers and builders is to provide all the necessary weight, but not an ounce of needless weight. The care with which they are designed, built and tested makes them run with a minimum of noise and vibration. Only materials of the highest quality are used in their building. In short, the whole aim is to build engines which will successfully meet the boat test in either yacht or workboat.

### Wyman-Gordon Forgings

Wyman-Gordon, "the crankshaft makers," with plants at Worcester, Mass., Cleveland, Ohio, and Chicago, Ill., are busy these days taking care of the increased demand for their products. Many engines at the show have Wyman-Gordon backbones.

### Freeport Company Repair Motors

Repairing as it should be done, whether it's a timer or a twelve-cylinder motor, you'll find them being overhauled in the shops of the Freeport Engine Company of Dorchester, Mass. Owners from all parts of the country send their engines and broken parts for repair and overhauling.

### Electric Searchlights

Among the essential items of equipment on many of our large yachts can be found high-powered search lights which are very useful in picking up small objects at sea or mooring buoys, docks, etc., when in port. The accepted form of these is generally a projector equipped with a self-feeding arc lamp and a parabolic mirror. Carlisle & Finch Company, Cincinnati, Ohio, have become widely known as expert builders of this class of equipment. Their lamps are used on vessels of all sizes from the smallest launch to the largest vessels in Uncle Sam's Navy.

### Compressed Air Whistles

The complete whistle outfits manufactured by the General Utility Company of Philadelphia is meeting with the approval of the boat owner. These outfits are being installed in boats of all sizes. Mr. Robert Erlichman, president of the company, is delighted with the 1921 outlook for both the whistle outfit and for General Lighting Cut Piston Rings which they also manufacture.

### Marblehead Green Paint Popular

Stearns-McKay Manufacturing Company of Marblehead, Mass., in line with the other plant manufacturers, are selling more Marblehead Anti-Fouling Green and Semi-Enamel White than ever before. This is, of course, to be expected in view of the quality of their paints.



Edison Storage Battery Room, showing delicate apparatus in same compartment. No corrosive fumes from Edison batteries

### A Correction

An unfortunate error appeared on page 172 of December MoToR Boating in the advertisement of the Smith-Meeker Engineering Company, New York. We wish to make a correction and the cut above is shown properly instead of upside down as it appeared. Also the caption under the sectional view of the Edison Storage Battery should read: "Note the rugged construction of cells. No delicate rubber or glass jars to break."

### Eight Day Ship's Clocks

What is nicer in the yacht club house or on board one's boat than a handsome ship's striking clock such as is made by the Seth Thomas Clock Company. For many years they have been producing high-grade movements and are to-day furnishing many clocks to the U. S. Navy and the Shipping Board. Thousands of these were used during the war by the many ships built during that time. High-grade eight-day jeweled time and eight-day jeweled ship's striking clocks in various types of wooden and metallic cases as well as a mediumgrade clock of a similar type can be obtained from jewelers throughout the country.

### Nelseco Engines Popular with Big Yachts

By reason of the economy and low operating cost of the heavy oil Diesel type engines, many of these are being used as power plants for large yachts which formerly required steam plants. The Idealia, one of the first big yachts to be equipped with Nelseco Diesel engines, has been in operation for several years without trouble. Her 120 h.p. motor develops a speed of over 14 m.p.h. at about 350 r.p.m. with a fuel consumption of only six gallons of pure oil per hour. The equivalent cost to obtain the same speed with gasoline motors would be approximately ten times as much. These engines can be supplied in sizes up to 3400 h.p. and the broad experience of the engineers of this company is at the disposal of those who are investigating this type of power equipment.

### Anderson Engines Are Rugged

A sturdy series of engines of the four cycle type are being built by the Anderson Engine Company, Chicago, Illinois. They are furnished in four to twenty-four h.p. sizes from one to four cylinder units. In addition a larger fifty h.p. motor is included which is a reliable heavy duty machine.

### Banfield Boats Are Seaworthy

A most seaworthy line of motor cruisers is being produced at the Banfield Boat and Launch Works, Atlantic Highlands, N. J. These boats are patterned after the famous Seabright dory models and are remarkably safe for their size.

### Coes Wrench

Eighty years of manufacturing is a long time, particularly when devoted to one product. The Coes Wrench Company of Worcester, Mass., are looking for the biggest sales year they have ever experienced. Universally known, their wrenches need no introduction.

### Clothel

After visiting the show a profitable hour can be spent in a trip to the show rooms of the Clothel Refrigerating Company, 61 Broadway, New York City. Several plants of different sizes are in operation and the details of making your own ice will be explained.

### U. S. Vaporizer

Mr. Olsen of the U. S. Vaporizer Company, Boston, Mass., tells us that many motor manufacturers are adopting the new appliance as stock equipment on their engines. Both domestic and foreign orders lately received indicate a boom in this field.

### Niagara Motors Are Powerful

The smooth, steady flow of the world's greatest waterfall is typical of the smooth, steady power stream of the Niagara Marine Motors. A genuinely high-grade motor produced in quantities which can be given individual attention and careful testing is delivered to the buyer. Necessarily all materials and workmanship entering into these motors is the best that can be had. The present design is the development of long experience and keeps pace with the progress of automatic engineering practice. The superiority of the design is shown by such features as separate T-head cylinders, bearing between each crank, long light-weight pistons, and many others.

### A Handy Small Motor

A real little engine is being built out in California by the Maynard-Adams Engine Company. This motor is a 3½-h.p. four cycle with overhead valves, and is very suitable for skiffs, dories, tenders and other small boats. All parts subject to wear are standard Ford parts and readily replaceable throughout the country.

### Builders of Record Breakers

The C. C. Smith Boat & Engine Co., of Algonac, Mich., are present at the show this year and are willing to explain just how they go about the building of such record-breaking speed boats as Miss America, the winner of the Harmsworth Trophy in England last fall, and the family of Miss Detroits owned by Gar Wood which have also developed remarkable speed for their size. These boats have all been powered with the Smith Marine twin-six motor which Gar Wood characterizes as superior to any marine engine in the world for hydroplanes, cruisers or run-

### Peerless Motors

At space G-2, in personal charge of E. L. Grimm, the Peerless Marine Motor Company, of Buffalo, N. Y., are exhibiting a complete assortment of Peerless gasoline and kerosene motors ranging in size from the 5 h.p. single-cylinder to the 50 h.p. fourcylinder model.

### Purchasing a Rebuilt Motor

Some men take the view that a rebuilt motor is dear at any price, but this is certainly not true. There are hundreds of them in use giving satisfaction in all parts of the world. In view of the saving in price between the price of a rebuilt motor and the new one, the rebuilt motor is well worth while for any one who has not a large amount of money to invest. A man of means will naturally prefer the new machine and will care very little what it costs if it meets his requirements.

A rebuilt motor should give good satisfaction. The first point to be considered in buying a rebuilt motor is: Is the motor which has been rebuilt a good motor which usually gives good satisfaction and which has a good reputation? The next impor-tant question is: Just what is meant by "rebuilt," as used by those selling the motor to you?

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Bruns, Kimball & Co. make it a practice to take down and examine each machine that comes into their shop. If any defects are found, they are carefully remedied. If certain parts are found seriously defective, they are replaced with new parts which are carefully fitted. All bearings are scraped to a perfect fit. The fitting of gaskets, etc., is also carefully cared for and before the motor is allowed to leave the shop it is inspected by the chief mechanic, who was formerly head of the testing-room of the Sterling Engine Company in Buffalo, N. Y. The timing of four-cycle engines, the proper adjustments of timers or make-and-break sparker or magnetos on all engines, etc., are carefully looked after, and these rebuilt machines leave Bruns, Kimball looked after, and these rebuilt machines leave Bruns, Kimball looked after, and these rebuilt machines leave Bruns, Kimball & Co.'s shops in first-class condition, in many cases as good as new. Many of these rebuilt engines have been used between three and four years before any overhauling was found necessary. Unfortunately, however, no mechanical department is infallible and there have been machines which have gone through which have not proven fully satisfactory. The treatment of customers in these cases is the best indication of the reliability of the concern.

Bruns, Kimball & Co. refer with considerable pleasure to the Bruns, Kimball & Co. refer with considerable pleasure to the few who have had occasion to make complaints, and point with pride to the liberal manner in which the defects have been adjusted. The instances where these rebuilt engines have not proven fully satisfactory, however, have been extremely rare. The workshops of Bruns, Kimball & Co. are open to the inspection of any prospective buyer, and there is no secret about the work done or to be done on a rebuilt machine. The exhibit

of rebuilt machines which Bruns, Kimball & Co. offer for sale is an interesting one, ranging from 1½ h.p. and 2 h.p. motors up to 300 h.p. and 500 h.p. machines.

### Frisbie Motors

William E. Gibb, sales manager of the Frisbie Motor Company, Middletown, Conn., is in charge of their exhibit this year. 5-, 7-, 10-, 16-, 30-, and 40-h. p. engines are on display.

The 5, 10-, and 30-h.p. are 4½-inch cylinder, with 5-inch stroke, and the 7-, 16-, and 40-h.p. are of 6-inch cylinder, with 6-inch stroke. All of these motors are equipped with Paragon Reverse Gears.

They are showing on one of the engines their kerosene devices and on another their special slow-down attachment, which is of interest to the salmon fishermen, crabiongers, etc. The four-cylinder motors are shown with the new type of reverse gear.

### Lawley's Runabouts

George Lawley & Son Corp., of Boston, Mass., have their exhibit in Block B-1, main floor, the same as last year. They are exhibiting a 36-foot mahogany Sedan and also a 30-foot V-bottom runabout. Both of these boats are of double-planked mahogany and finished in mahogany.

The Sedan is equipped with a six-cylinder Van Blerck motor, speed about thirty miles per hour, and the runabout with a four-cylinder G-R Sterling, speed a little better than 30½ knots.

### Albany Boats

The Albany Boat Corporation, of Watervliet, New York, will exhibit the following

1. A 26-foot runabout, Design No. 450, beam 6 feet. 1. A 20-100t runabout, Design No. 450, beam o teet. This is a codar planked hull with sides painted white; upper works, cockpit, etc., finished in mahogany. The cowl dash and instrument board were originated by the Albany Boat Corporation and are distinguishing features on Albany boats. The power plant is a four-cylinder 40 h.p. Red Wing motor with electric starting and lighting outfit, and the speed is 20 m.p.h. This model has been as much refund from year to year that it really. model has been so much refined from year to year that it really has attained a very high degree of efficiency with this horse-power. It is a beautiful handling boat and a good little sea boat. The fastenings and equipment are all suitable for salt water use.

water use.

2. A 32-foot fast family launch, Design No. 442, beam 6 feet 6 inches. It is planked, decked and finished throughout in mahogany and has salt water fastenings and equipment. The upholstery is genuine leather, and the boat is A No. 1 in its construction and equipment in every respect. The power plant is a six-cylinder type LM, Hall-Scott motor and the speed is 36 m.p.h.

36 m.p.h.

3. A new type of high speed runabout 33 feet 8 inches overall by 7 foot beam. This is a mahogany boat throughout, complete with weights and lines figured specially for the very maximum speed, and to conform to the rules of the Carl Fisher Trophy races. The design of this boat is an absolutely new design, entirely different from any model that has ever been shown or used in the motor boat industry, and shows considerably higher speeds than anything in runabout construction that has yet been used.

### J. V. B. Engines Demonstrate Sliding Reverse Gear

The J. V. B. Engine Company, of Cleveland, Ohio, are exhibiting three engines. One of these engines is so arranged so that the sliding transmission reverse gear can be easily operated by all persons attending the exhibit. Another of the engines is dissembled so that all the working parts can be seen. The third engine is exhibited as a unit, showing the completed product.

### Twentieth Century Motors

The New York Yacht, Launch & Engine Company's exhibit is in Block F-1 and F-2, and consists of a 4-cylinder  $6\frac{1}{2}$  x  $8\frac{1}{2}$ -inch 40-50 h.p. and a 6-cylinder  $6\frac{1}{2}$  x  $8\frac{1}{2}$ -inch 65-75 h.p. heavyduty 20th Century motor with model of a houseboat and an automatic advertising machine showing pictures of the many boats that they have built.

### Tiebout's Marine Hardware

W. & J. Tiebout, 118 Chambers Street, New York, have a number of salesmen at their booth to show spectators the variety and extent of their large line of marine and ship hardware. They are issuing a 500-page catalog which should interest every trade, boat builder and boat owner.

### Carpenter Shows Accessories

Space 41 is occupied by Geo. B. Carpenter & Co., of Chicago. They are showing Electric Searchlights, together with Searchlight Controls, Reversing Devices, Kainer Ropeless Steerers, Carpenter Drum-Type Steerer and special fittings of their own

### Wolverine Motors

The Wolverine Motor Works, Inc., of Bridgeport, Conn., are exhibiting a six-cylinder 11-inch bore by 15-inch stroke 200 h.p. exhibiting a six-cylinder 11-inch bore by 15-inch stroke 200 h.p. motor. This motor is complete with reverse gear, electric starting outfit and mechanically operated lubricator. They are also showing a three-cylinder 42 h.p. 8½-inch bore by 9-inch stroke motor and in addition to these engines are displaying a four-cylinder 5½-inch x 7-inch yacht engine. The 42 h.p. and 200 h.p. engines are kerosene motors, and the four-cylinder machine a gasoline engine, all equipped with high-tension ignition systems.

### Erickson Accessories

Space No. 62 is occupied by Hubbard H. Erickson & Co., of Chicago. Their exhibit consists of the Erickson Electric Searchlight, hardwood steering wheels, Erico spark and throttle controls, Erico electric running lights, Erico Universal Stuffing Box, and miscellaneous fittings. The Erico Universal Stuffing Box is the latest addition to their line. It is unique among self-aligning stuffing boxes in that it permits not only radial but better a light through the standard of the restallation to their line. lateral adjustment after installation at any time.

(Continued on page 154)

# New 21-foot Hacker Standardized Runabout

Production Started on Kermath Powered Boats Which Promise to Be Record Breakers



The New Hacker 21-footer

THE Hacker Boat Co., of Detroit, Mich., have started in on a production basis on a standardized high-class 21-foot all-around runabout. This job is from the boards of John L. Hacker, and is based on all former boats of his work in that size. It was thoroughly tested out in the past few weeks, and has proven to be successful in every sense of the word.

In Hacker, and is based on all former boats of its work in that size. It was thoroughly tested out in the past few weeks, and has proven to be successful in every sense of the word.

This 21-foot job is really the biggest little boat ever produced up to this time. It is just 21 feet in length, and carries a beam of five feet six inches. It is arranged with two Wickerkraft bucket type seats forward, and has a large after seat, which will accommodate three passengers comfortably. Then there is also ample room for two small folding chairs. The aft seat is also arranged so that it may be removed to allow greater room for fishing purposes, etc. The job is finished in mahogany and pine on the decks, having covering boards and center plank of mahogany and the panel of pine strips, with seams filled with black marine blue, making a very pretty looking job. The balance and interior is finished in mahogany. The sides and bottom are cedar, of special construction, and painted up to deck. The construction carried out in this job is something new, making a much lighter job and also stronger than the older method of construction. The job as a whole is built on the regular Hacker order, and is absolutely first class in every respect. However, owing to

production, it will sell at a very popular price. It is perhaps the highest class job in a boat of that size ever produced, and has really as much room as the average 25 foot boat.

highest class Job in a boat of that size ever produced, and has really as much room as the average 25-foot boat.

This little boat is powered with the Kermath 16 h.p. motor, and has done over the mile trials close to 18 miles an hour, and is termed a 16-to-18-mile boat. The motor can be throttled down so that the boat will run slow enough to troll. It can then be speeded up enough to get somewhere in short order. The outfit comes complete in every respect. The motor is under hatches, and is equipped with a two-unit starting and lighting outfit. The running lights, etc., are also electric. All fittings are of bronze and nickel-plated. Controls are carried to steering wheel on the same order as the auto. This little boat controls with perfect ease. It will turn in three times its own length, and everything is so simple that it is going to make a great hit with the ladies. As the outfit as a whole is so convenient and simple to operate, a boy, girl or lady will be able to operate this little boat without any trouble.

any trouble.

The Hacker Boat Co. have just completed a large new plant in Mt. Clemens, a suburb close to Detroit, which they will confine to this one job. They are building this as good as they know how and boats will be ready for delivery within thirty days. Full data will be sent anyone interested in this outfit upon request.

### Pepromists Wanted

By J. B. Farr

Business will be better and more satisfactory in the near future

Good service is the measure of good business and it is one of the elements that has been neglected in the past four years. We are all born to serve others in our various capacities and

when we give poor service we can only expect poor returns.

Our biggest American business "The National Government" has just received a "knock out" blow from the people, expressing their complete dissatisfaction and disgust for the entire administration.

Our trusted and elected servants forgot their birthright to serve their fellowmen, forgot that they were hirelings of a higher order and got among the allhighest class of dictators—and then got canned.

The same thing happens just the same in small business and in the adjustment of things generally the fittest will survive in a most healthy way and the \$18.00 a day man who was worth about a nickel will only be a memory.

Marine engine and boat builders have had their share of grief and the heads of factories and their best men have been out begging for materials here and there, only to meet most discouraging results. Where salesmen formerly called on the trade to sell raw

Where salesmen formerly called on the trade to sell raw materials such as lumber, hardware, steel and iron, the situation became completely reversed and we went out and begged for those materials.

A \$2,000.00 order was frowned on as a nuisance and the foundries, forge plants and others lost their heads completely and talked only in big figures.

They forgot that the time would come when an influx of the control of the contro

They forgot that the time would come when an influx of goods from other nations, and a decreased foreign demand would alter the demand, and set the whole structure of business back to a normal basis.

Incompetence, inefficiency and high handed methods are about to be laid away in an undecorated casket and without ceremony.

(Continued on page 154)

# American Manufacturers of Two-Cycle Marine Motors

An Alphabetical List of Two-Cycle Marine Motors With the Names and Addresses of Their Manufacturers Giving the Range of Power Produced by Each

| Two-Cycle Marine Motor Manufacturers   | Superior Superior Motor Wks., Jackson, Mich.   |
|--|--|
| Acadia Acadia Gas Engine, Ltd., Bridgewater, N. S.   | Toledo Universal Machine Co., Bowling Green, O.  |
| Acadia. Acadia Gas Engine, Ltd., Bridgewater, N. S. 3, 4, 5, 64, 8, 10, 13, 15, 16, 24 H. P. 1-3 cyls.  American Engine Co., Detroit, Mich. 2½, 4, 6, 8, 14, 20, 30 H. P. 1-4 cyls.  Barber. Barber Bros., King Bros., Successors, Syracuse, N. Y. 2½, 4, 6, 5, 8, 9, 12, 18, 24, 27, 36, 40, 60 H. P. 1-3 cyls.  Barker. Barker Factory, Norwalk, Conn. 1¼, 2½, 4, 6½, 8 H. P. 1-2 cyls.  Bridgeport. Bridgeport Motor Co., Inc., Bridgeport, Conn. 4½, 6, 9, 12 H. P. 1-2 cyls.  Brown Talbot. Brown Talbot Machinery Co., 19 Oakland St., Salem, Mass.  Bud-E. The Carlyle Johnson Machine Co., 52 Main St., Manchester, Conn. 5 H. P. 2 cyls.  | Superior   Superior Motor   Was, Jacason, Mich.  |
| Barber Bros., King Bros., Successors, Syracuse, N. Y. 2½, 4, 5, 6, 8, 9, 12, 18, 24, 27, 36, 40, 60 H. P. 1-3 cyls.  | Two-Cycle Outboard Motor Manufacturers   |
| 114, 214, 4, 614, 8 H. P. 1-2 cyls.  | Aerothrust Aerothrust Engine Co., La Porte, Ind.   |
| Bridgeport Bridgeport Motor Co., Inc., Bridgeport, Conn.   | 3, 5 H. P. 2 cyls.  Amphion  |
| Brown Talbot Brown Talbot Machinery Co., 19 Oakland St., Salem, Mass. 5, 10, 15, 20, 30 H. P. 1-2 cyls.  | Amphilia Clarence J. Alten, 040 50. Fierce St., Milwaukee, Wis. 4 H. P. 2 cyls.  Evinrude Motor Co., 279 Walker St., Milwaukee, Wis. 2, 3/5 H. P. 1 cyl.  Gierholt Gas Motor Co., Detroit, Mich. |
| Bud-E The Carlyle Johnson Machine Co., 52 Main St., Man-   | 2, 3½ H. P. 1 cyl.   |
| Cady of CanastotaC. N. Cady Co., Inc., Canastota, N. Y.  | Gilmore Marine Moror Corn 404 24th St. Detroit Mich  |
| Caille Perfection Motor Co., Detroit, Mich.  | 2 H. F. 1 cyl.   |
| Easthope Easthope Bros., 1729 Georgia St., Vancouver, B. C.  | Noban  |
| Emerson Herfurth Eng. & Mach. Co., Alexandria, Va.   | 3 H. P. 2 cyl.   |
| Evinrude Evinrude Motor Co., 279 Walker St., Milwaukee, Wis.   | 2 H. P. 1 cyl.   |
| Foreman Foreman Motor & Mach. Co., Ltd., Toronto, Can.   | 2 H. P. 1 cyl.   |
| Frazer Adams Frazer Bros. Co., Adams, N. Y.  | L. A   |
| Bud-E The Carlyle Johnson Machine Co., 52 Main St., Manchester, Conn. Cady of Canastota. C. N. Cady Co., Inc., Canastota, N. Y. 3, 4, 6, 8 H. P. 2-4 cyls. Caille Caille Perfection Motor Co., Detroit, Mich. 2½, 4, 6, 8, 14, 20, 30 H. P. 1-4 cyls. Easthope Easthope Bros., 1729 Georgia St., Vancouver, B. C. 4, 7 H. P. 4 cyls. Emerson Herfurth Eng. & Mach. Co., Alexandria, Va. 10, 20, 40, 45, 70 H. P. 1-6 cyls. Evinrude Evinrude Motor Co., 279 Walker St., Milwaukee, Wis. 2, 4 H. P. 1-2 cyls. Foreman Foreman Motor & Mach. Co., Ltd., Toronto, Can. 12 H. P. 2 cyls. Frazer Adams 12 H. P. 2 cyls. Gilmore Gilmore Marine Motor Corp., 404 24th St., Detroit, Mich. 2, 4, 5, 10 H. P. 1-2 cyls.  |  |
| Gray Gray Motor Co., 2108 Mack Ave., Detroit, Mich.  | Bolinders Bolinders Co., 30 Church St., New York, N. Y.  |
| Gray Gray Motor Co., 2108 Mack Ave., Detroit, Mich. 4, 8 H. P. 1-2 cyls.  Guarantee Guarantee Motor Co., 369 Bay St., North, Hamilton, Ont. 3½, 5, 7½ H. P. 1 cyl.  H. L. B. H. L. Brownback Co., Norristown, Pa.  | ## Two-Cycle Heavy Oil Motor Manufacturers    Bolinders  |
| H. L. B H. L. Brownback Co., Norristown, Pa. 3 H. P. 1 cyl.  | 650, 975, 1100, 1650, 1800, 3000 H. P. 4-6 cyls.<br>Fairbanks-Morse C.O. Fairbanks-Morse Co., 900 So. Wabash Ave., Chicago, Ill.   |
| Hartford Gray-Prior Machine Co. 56 Suffield St. Hartford Conn.   | 30, 45, 60, 75, 100, 150, 200, 300 H. P. 2-6 cyls.<br>G. G   |
| Imperial   | 10, 14, 30, 45, 60, 90, 125, 180, 240 H. P. 2-6 cyls.<br>Kahlenberg Bros. Co., Two Rivers, Wis.  |
| 5, 8, 10, 20 H. P. 1-2 cyls.  Imperial. Bruce Stewart & Co., Let Charlottetown, P. E. I. 4, 5, 10, 15, 20, 30 H. P. 1-3 cyls.  Kahlenberg. Kahlenberg Bros. Co., Two Rivers, Wis. 3, 4, 6, 8, 12, 15, 16, 24, 30, 36, 45, 54, 55, 85 H. P. 1-3   | 36, 54, 60, 70, 90, 120 H. P. 2-4 cyls.  Lazier Gas Engine Co., 190 Main St., Buffalo, N. Y.   |
| cyls. Camden Anchor Rockland Machine Co., Camden, Me.  | 50, 100, 150, 200, 300 H. P. 1-6 cyls.   |
| Knox         Cyfs.           Camden Anchor Rockland Machine Co., Camden, Me.         3, 4½, 5½, 6, 7½, 9, 11, 15 H. P. 1-2 cyls.           Lathrop.         1. W. Lathrop Co., Mystic, Conn.           3, 4, 5, 6, 7, 8, 10, 12, 14, 16, 20, 24, 36 H. P. 1-3 cyls.           L-A.         Lockwood Ash Motor Co., Jackson, Mich.           2½, 4, 6, 8 H. P. 1-2 cyls.           L. & D. Motor Wks., 75 Prospect Ave., Hartford, Conn.           2 H. P. 1 cyl.   | 71/3, 15, 30, 45, 60 H. P. 1-4 cyls.  Mietz Aug Mietz Corp. 430 Fast 19th St. New York N. V.   |
| 3, 4, 5, 6, 7, 8, 10, 12, 14, 16, 20, 24, 36 H. P. 1-3 cyls.   | 15, 60, 75, 350 H. P. 2-4 cyls.  |
| L-ALockwood Ash Motor Co., Jackson, Mich.<br>2½, 4, 6, 8 H. P. 1-2 cyls.   | 7, 14, 22, 30 H. P. 1-4 cyls.  |
| L. & D L. & D. Motor Wks., 75 Prospect Ave., Hartford, Conn. 3 H. P. 1 cyl.  | Nordberg Nordberg Mfg. Co., Milwaukee, Wis. 380, 600, 1000, 1500, 2000, 3000 H. P. 4-6 cyls.   |
| Mianus   | Remington  |
| Motorgo Sears, Roebuck & Co., 925 Homan Ave., Chicago, Ill. 2½, 4, 6, 8 H. P. 1-2 cyls.  | Skandia Skandia Pacific Oil Engine Co., Oakland, Cal.  |
| Mohawk S. R. Mfg. Co., Schenectady, N. Y.<br>3½, 5, 6, 7, 10, 12, 16, 18, 21, 25, 30 H. P. 1-4 cyls.   | 9, 16, 24, 38, 55, 70, 120, 140, 180, 240, 350, 500 H. P.  |
| Ontario  | Venn Severin Venn Severin Machine Co., 1317 W. North Ave., Chicago,  |
| Palmer Palmer Bros. Engines, Inc., Cos Cob, Conn.  | 10, 20, 25, 40, 45, 70, 100, 150, 200 H. P. 1-4 cyls.<br>Weiss Engine Co., 17 Battery Place, New York, N. Y.   |
| L. & D. L. & D. Motor Wks., 75 Prospect Ave., Hartford, Conn.  3 H. P. 1 cyl.  Mianus. Mianus Motor Wks., Stamford, Conn. 3, 5, 6, 7½, 10, 15, 20 H. P. 1-2 cyls.  Motorgo. Scars, Rocbuck & Co., 925 Homan Ave., Chicago, Ill. 2½, 4, 6, 8 H. P. 1-2 cyls.  Mohawk. S. R. Mig. Co., Schenectady, N. Y. 3½, 5, 6, 7, 10, 12, 16, 18, 21, 25, 30 H. P. 1-4 cyls.  Ontario. A. E. Olmstead & Sons, Pulaski, N. Y. 2, 3, 6, 7, 9, 12, 14, 21, 28 H. P. 1-4 cyls.  Palmer Pros. Engines, Inc., Cos. Cob. Conn. 2½, 4, 5, 6, 7¼, 10 H. P. 1-2 cyls.  Pierce-Budd. Pierce Motor Co., Bay City, Mich. 6, 15, 25, 40, 60 H. P. 1-6 cyls.  Neponset Engine & Machine Co., Neponset Sta., Boston, Mass. 1½, 3, 6, 8, 12, 10, 18, 24 H. P. 1-3 cyls.  Roberts. Roberts Motors Co., Sandusky, O. 4, 16 H. P. 1-4 cyls. | 45, 60, 75, 120, 150, 200, 225, 300, 400 H. P. 3-4 cyls.   |
| Rex Neponset Engine & Machine Co., Neponset Sta., Boston,  | Steam Plant Manufacturers  |
| Roberts  | Talbot Atlantic Marine & Construction Co., Inc., 233 Broadway, N. Y.   |
| 4, 16 H. P. 1-4 cyls. St. Lawrence St. Lawrence Eng. Co., Ltd., Brockville, Ont. 3, 4, 6, 8, 12, 18 H. P. 1-3 cyls.  | way, N. 1.<br>15, 25, 50, 100, 200, 300, 400, 600, 1000, 2000 H. P.<br>2-4 cyls.   |

Two-Cycle Marine Motors for 1921

The initials used in the column headed Ignition indicate the standard equipment supplied, and have the following meanings: B—Battery Ignition: B. & M.—System using both battery and coll with magneto; M. & B.—Make and break system with either batteries or low tension magneto; J. S.—Jump spark battery and coll system; M.—High tension magneto: Opt.—Purchaser has the option of make and break or jump spark system

| Rated |                   | No. of | Bore &    | -      |                      | 2 or 3 |          | Rated | · IIIII           |       | Bore &    |        |                   | 2 or 3 |            |
|-------|-------------------|--------|-----------|--------|----------------------|--------|----------|-------|-------------------|-------|-----------|--------|-------------------|--------|------------|
| H. P. | Motor             |        |           | R.P.M. | Wt.                  | Port   | Ignition | H. P. | Motor             | Cyls. | Stroke    | R.P.M. | Wt.               | Port   | Ignition   |
| 134   | Barker            | 1      | 3 Ax31/2  | 550    | 110                  | 2      | Opt.     | 3     | Mianus            | 1     | 4 ×4      | 550    | 195               | 2      | M. & B.    |
| 134   | Rex               | i      | 21/2×21/2 | 700    | 55                   | 9      | I. S.    | 3     | Ontario           | i     | 336x336   | 900    | 150               | 3      | I. S.      |
| 9/2   | Evinrude          | *      | 256x214   | 800    | 73                   | 9      | M        | 9     | Rex               | 9     | 216x216   | 700    | 150<br>85         | 9      | 1 8        |
| 9     | Gilmore           | 2      | 3 x235    | 800    | 20                   | 9      | J. S.    | 9     | St. Lawrence      | - 1   | 314×314   | 900    | 100               | 9      | 1 6        |
| 9     | Frazer Adams      | 4      |           | 900    | 55<br>73<br>38<br>87 | 9      |          | 9     | Snapper           | - 5   | 41/24     |        | 100<br>205<br>140 | 0      | M. & B.    |
| 5     |                   | 1      | 3 14 x 3  |        | 60                   | 3      | J. S.    | 9     | Toledo            | - 1   | 314×314   | 750    | 140               |        | I. S.      |
| 91/   | Ontario           | 1      | 25%x3     | 1,200  | 140                  | 3      | 1. 8.    | 9     | Waterman          | - 1   | 234 x3    | 1,000  | 140               | - 5    |            |
| 223   | American          | 1      | 314x314   | 800    | 140<br>75            | 2      | 1. S.    | 914   |                   | - 4   | 292 ×3    | 700    | 68<br>175         | 9      | Opt.       |
| 233   | Barber            | . 1    | 314x314   | 750    | 70                   | 3      |          | 314   | Guarantee         | 4     | 374 X329  | 900    | 1/0               | 2      | J. S.      |
| 233   | Barker            | 1      | 436x434   | 450    | 170                  | 2      | Opt.     | 372   | Mohawk            | 1     | 332x332   | 900    | 145               | * :    | Opt.       |
| 259   | Caille            | 1      | 33433     | 800    | 140                  | 2      | J. S.    | 4     | Acadia            | A     | 4 x4      | 650    | 165               | 2      | M. & B     |
| 239   | L-A               | 1      | 314x314   | 750    | 165<br>97            | 2      | Opt.     | 4     | American          |       | 33/4×33/4 | 800    | 150<br>150        | 3      | J. S.      |
| 239   | Motorgo           | 1      | 314x314   | 750    | 97                   | 3      | В.       | 4     | Barber            | 1     | 4 x4      | 600    | 150               | 3      | J. S.      |
| 21/2  | Palmer            | 1      | 334x313   | 500    | 135                  | 3      | J. S.    | 4     | Barker            | 1     | 4 74 x 5  | 400    | 220               | 2      | Opt.       |
| 256   | Waterman          | 1      | 234x3     | 800    | 36                   | - 3    | M        | 4     | Cady of Canastota | 1     | 436×4     | 700    | 160               | 3      | В.         |
| 3     | Acadia            | 1      | 4 x31/2   | 550    | 150                  | 2      | M. & B.  | 4     | Caille            | 1     | 3%x31/2   | 800    | 150               | 2      | J. S.      |
| 3     | Cady of Canastota | 1      | 354×334   | 700    | 140                  | 3      | В.       | 4     | Easthope          | 1     | 3% x5     | 650    | 150<br>230        | H      | J. S.      |
| 3     | Capital           | 1      | 334x334   | 800    | 120                  | 3      | J. S.    | 4     | Evinrude          | 2     | 236x236   | 1,150  | 68                | 2      | M.         |
| 3     | Greenport         | 1      | 4 x4      | 550    | 281                  | 2      | M. & B.  | 4     | Frazer Adams      | 2     | 3 4x x 3  | 900    | 68<br>158<br>68   | 3      | J. S.      |
| 3     | H. L. B.          | 3      | 31/4×3    | 800    | 80                   | 2      | I. S.    | 4     | Gilmore           | 2     | 3 x234    | 800    | 68                | 3      | I. S.      |
| 3     | Kahlenberg        | i      | 334x334   | 600    | 125                  | 2      | M. & B.  | 4     | Gray              | 1     | 334x334   | 800    | 150               | 3      | 1. S.      |
| 3     | Knox              | i      | 4 ×4      | 600    | 200                  |        | Opt.     | 4     | Greenport         | 1     | 45 x 5    | 500    | 381               | 2      | M. & B.    |
| 3     | Lathrop           | 1      | 4 x4      | 500    |                      |        | Opt.     | 1 4   | Imperial          | i     | 4 x334    | 500    | 220               | 3      | I. S.      |
| 3     | L. & D.           | 1      | 31/4×4    | 900    | 98                   | 2      | I. S.    | A A   | Kahlenberg        | i     | 4 +4      | 550    | 160               | 9      | MAR        |
| 0     | L. & D.           |        | 07211     | 900    | 90                   | -      | J. O.    | 11 4  | Maintenberg       |       |           | 000    | 100               |        | Int. of D. |

# Two-Cycle Marine Motors for 1921—(Continued)

| -                               |                            | 1 W              | 0-C   | ycle          | war        | ine      |                             |                | 1921-                      |                 |  | u)             |                     |                |                           |
|---------------------------------|----------------------------|------------------|---|---------------|------------|----------|-----------------------------|----------------|----------------------------|-----------------|--|----------------|---------------------|----------------|---------------------------|
| Rated                           | 38                         | No. of I         | 3 ore &                                       | n n 24        | 9974       | 2 or 3   | Ignition                    | H. P.          | Motor .                    | No. of E        | lore &<br>Stroke                       | R.P.M.         | Wt.                 | 2 or 3<br>Port | Ignition                  |
| H. P.                           | Motor<br>Lathrop           | Cyls. S          | 34x5  | R.P.M.<br>500 | Wt.        | Port 2   | Opt.                        | 10 7           | <b>dohawk</b>              | 2               | 436x436                                | 500            | 510                 | Opt.           | Opt.                      |
| 4                               | L-A<br>Motorgo             | 1 4              | x4<br>x4                                      | 750<br>750    | 203<br>135 | 2 2 2    | Opt.<br>B.                  |                | almer<br>Cnox              | 2 2             | 432x432<br>534x534                     | 650<br>525     | 325<br>575          | 3              | J. S.<br>Opt.             |
| 4                               | Palmer<br>Palmer           | 1 4              | 36x436  | 450<br>475    | 240<br>220 | 2 3      | M. & B.<br>J. S.            |                |                            |                 |  |                |                     |                |                           |
| 4                               | Roberts                    | 1 3              | 36x436<br>36x4                                | 1,000         | 122        | 3        | Opt.                        | Pated          | 12 to 20                   | No. of          |  | wo-cyl         | se M                | 2 or 3         |                           |
| 434                             | St. Lawrence<br>Bridgeport | 1 4              | 14x4<br>14x5                                  | 900<br>500    | 300        | 3        | J. S.<br>M. & B.            | Rated<br>H. P. | Motor                      | Cyls.           | Stroke                                 | R.P.M.         | Wt.                 | Port           | Ignition                  |
| 432                             | Knox.                      | 1 4              | 14x416  | 550           | 250        |          | Opt.                        |                | larber<br>larber           | 2               | 634x634<br>434x434                     | 500<br>600     | 400<br>375          | 3              | ]. S.                     |
|                                 | 5 to 8 Ho                  | rsepon           | er Ta   | vo-Cycl       | e Mo       | ors      |                             | 12 1           | Barber<br>Bridgeport       | 3               | 4 x4<br>5¼x5¾                          | 600<br>500     | 390<br>550          | 3              | J. S.<br>M. & B.          |
| Rated                           |                            | No. of B         | lore &  |               |            | 2 or 3 ' | ***                         | 12 (           | apital                     | 2               | 4½x5½                                  | 800<br>800     | 420<br>375          | 3 3            | J. S.<br>B.               |
| H. P.                           | Motor<br>Acadia            |                  | troke<br>x4                                   | R.P.M.<br>750 | Wt.<br>165 | Port 2   | Ignition<br>J. S.           | 12 (           | oreman<br>Greenport        | 2               | 414 x414<br>512x6                      | 450            | 804                 | 2              | M. & B.                   |
| 5                               | Acadia                     | 1 4              | 16x5  | 350<br>750    | 300<br>150 | 3        | J. S.<br>M. & B.<br>J. S.   |                | Cahlenberg<br>Cahlenberg   | 1 2             | 634x7<br>5 x5                          | 350<br>400     | 750<br>650          | 2 2            | M. & B.<br>M. & B.        |
| 5 5                             | Barber<br>Brown Talbet     | 1 4              | 14x314<br>x4                                  | 750           | 200        | 2        | J. S.<br>M.                 | 12 1           | athrop                     | 1               | 71/4×71/4<br>51/4×8                    | 275<br>500     |                     | 2 2            | Opt                       |
| 5                               | Bud E<br>Frager Adams      | 2 3              | 36×436  | 1,200         | 110<br>182 | 3        | J. S.<br>M. & B.            | 13 1           | athrop                     | 2 2             | 514x614                                | 400            |                     | 2              | Opt.                      |
| 5                               | Greenport<br>Guarantee     | 1 5              | x535<br>36x436                                | 475<br>600    | 450        | 2 2      | M. & B.                     | 12             | Mianus<br>Mohawk           | 2 2             | 4%x5<br>4%x3%                          | 700<br>1,200   | 575<br>220          | Opt.           | J. S.<br>Opt.             |
| 5                               | Hartford                   | 1 4              | x436  | 700<br>500    | 230<br>280 | 3        | J. S.<br>M. & B.<br>J. S.   | 12             | Mohawk<br>Ontario          | 2 4             | 436x436<br>336x336                     | 700            | 400<br>390          | Opt.           | Opt.<br>J. S.             |
| 5                               | Imperial<br>Lathrop        | 1 5              | 16x4<br>74x5                                  | 500           |            | 2        | Opt.                        | 12             | Superior                   | 2 2             | 439x4                                  | 800<br>900     | 393                 | 3              | ]. S.<br>]. S.            |
| 5                               | Mianus<br>Mohawk           | 1 4              | %x5   | 500<br>500    | 335<br>310 | Opt.     | M. & B.<br>Opt.             | 12             | t. Lawrence<br>t. Lawrence | 3 2             | 4 x41/2<br>31/2x4                      | 900            | 300                 | 3              | J. S.                     |
| 5                               | Palmer<br>Snapper          | 2 3              | 34x334  | 700           | 180<br>340 | 3 2      | J. S.<br>M. & B.            |                | l'oledo<br>Acadia          | 2 2             | 434x434<br>534x5                       | 750<br>700     | 350<br>450          | 2 2            | Opt.<br>M. & B.           |
| 534                             | Gray                       | 1 4              | 34×434  | 1,100         | 170        | 3        | J. S.                       | 14             | American<br>Caille         | 2 2 2 2         | 434×434                                | 800<br>800     | 350<br>350          | 2 2            | J. S.<br>J. S.            |
| 53%                             | Knox<br>American           | 1 5              | 36x436  | 525<br>800    | 330<br>200 | 2        | Opt.<br>J. S.               | 14             | Lathrop                    | 2               | 6 x635                                 | 400            |                     | 3              | Opt.                      |
| 6                               | Barber<br>Bridgeport       | 1 4              | 34 x434                                       | 600<br>500    | 245<br>350 | 3        | J. S.<br>M. & B.            | 14             | Ontario<br>Acadia          | 2 3             | 5 x5<br>4 x4                           | 600<br>800     | 500<br>400          | 2 2            | J. S.<br>J. S.            |
| 6                               | Cady of Canastota          | 2 3              | 3%x3%   | 700           | 190        | 3 2      | - B.                        | 15<br>15       | Brown Talbot<br>Capital    | 1 3             | 7 x614<br>31/2x314                     | 350<br>1,200   | 600<br>220          | 3              | ]. S.<br>]. S.            |
| 6                               | Caille<br>Capital          | 1 4              | 14 x4 14                                      | 800<br>600    | 200<br>285 | 3        | J. S.<br>J. S.              | 15             | Greenport                  | 2 3             | A vale                                 | 400<br>500     | 1,025               | 3              | M. & B.                   |
| 6                               | Foreman<br>Greenport       | 2 3              | 134x334<br>134x6                              | 800<br>450    | 220<br>529 | 2        | B.<br>M. & B.               | 15             | Imperial<br>Kahlenberg     | 1               | 43/2×4<br>7 ×8                         | 325            | 900                 | 2              | J. S.<br>M. & B.          |
| 6                               | Greenport<br>Kahlenberg    | 2 4              |   | 550<br>400    | 431<br>400 | 2 2      | M. & B.<br>M. & B.          | 15<br>15       | Knox<br>Mianus             | 2               | 51/2×61/4<br>51/4×6                    | 500<br>450     | 700<br>875          | 2              | Opt.<br>M. & B.           |
| 6                               | Knox                       | 2 4              | 1 x4  | 600           | 340        | . 2      | Opt.                        | 15<br>16       | Pierce-Budd<br>Acadia      | 2 2 2           | 4 x4<br>534x6                          | 1,600          | 170<br>650          | Opt.           | J. S.<br>Opt.             |
| 6                               | L-A<br>Lathrop             | 1 (              | 314x314<br>514x5                              | 750<br>500    | 225        | 2        | Opt.<br>Opt.                | 16             | Kahlenberg                 | 2               | N46.46                                 | 380<br>400     | 950                 | 2 2 2          | M. & B.<br>Opt.           |
| 6                               | Lathrop<br>Mianus          | 1 4              | 534×634<br>134×5                              | 400<br>700    | 335        | 2 2      | Opt.<br>I. S.               | 16<br>16       | Lathrop<br>Mohawk          | 2 2             | 614x614<br>414x414<br>314x4<br>514x514 | 900            | 395                 | Opt.           | Opt.                      |
| 6                               | Mianus                     | 2 4              | 1 x4  | 550           | 355<br>155 | Opt.     | J. S.<br>M. & B.<br>Opt.    | 16<br>18       | Roberts<br>Barber          | 4 2             | 314x4<br>514x514                       | 1,000<br>550   | 265<br>535          | 3              | Opt.<br>J. S.             |
| 6                               | Mohawk<br>Mohawk           | 1 3              | 11/4 x 3 1/4<br>11/4 x 4 1/4<br>3 1/4 x 3 1/4 | 1,200<br>700  | 275        | Opt.     | Opt.                        | 18             | Barber                     | 3               | ************************************** | 600<br>800     | 500<br>530          | 3              | ]. S.<br>]. S.            |
| 6                               | Motorgo<br>Ontario         | 2 2              | 31/4x31/4<br>31/4x31/4                        | 750<br>900    | 154<br>230 | 3        | B.<br>J. S.                 | 18<br>18       | Capital<br>Mohawk          | 3               | 41/2×51/2                              | 700            | 510                 | Opt.           | Opt.                      |
| 6                               | Palmer<br>Pierce-Budd      | 1 1              | 5 x6<br>4 x4                                  | 400<br>1,500  | 350<br>125 | Opt.     | J. S.<br>M. & B.<br>A. K.   | 18<br>20       | St. Lawrence<br>American   | 3 2             | 4 x436<br>534x5                        | 900<br>600     | 495                 | 3 2            | Opt.<br>J. S.<br>J. S.    |
| 6                               | Rex                        | 1 4              | 436×5   | 600           | 310        | 3        | J. S.                       | 20<br>20       | Brown Talbot<br>Caille     | 2               | 534x5<br>534x5                         | 500<br>600     | 450<br>495          | 2 2            | J. S.<br>J. S.            |
| 6                               | St. Lawrence<br>Superior   | 1 4              | 314 x314<br>414 x4                            | 900<br>800    | 160<br>293 | 2        | ]. S.                       | 20             | Capital                    | 2 2             | 435×434                                | 1,200<br>1,200 | 250<br>250          | 3              | J. S.<br>J. S.            |
| 6                               | Toledo<br>Waterman         | 3 (              | 435x435<br>4 x4                               | 750<br>600    | 200<br>111 | 3        | Opt.<br>B.                  | 20<br>20       | Capital<br>Emerson         | 4 2             | 3½x3¼<br>5 x5                          | 1,250          | 342                 | 3              | I. S.                     |
| 6                               | Waterman                   | 2 :              | 2%x3  | 800<br>700    | 60<br>300  | 3 2      | M.<br>M. & B.               | 20 20          | Hartford<br>Imperial       | 2 2             | 5 x534<br>534x6                        | 700<br>500     | 440<br>825          | 2 3            | M. & B<br>J. S.           |
| 634                             | Acadia<br>Barker           | 1                | 514x5<br>514x614                              | 350           | 350        | 2        | Opt.                        | 20             | Lathrop                    | 2 2             | 7 x735                                 | 300<br>375     | 1,390               | 2 2            | Opt.<br>M. & B.           |
| 7 7                             | Capital<br>Easthope        | 1                | 436x434<br>6 x7                               | 800<br>450    | 160<br>909 | 3<br>H   | J. S.<br>A. K.              | 20             | Mianus                     |                 | 634x7                                  |                |                     |                | 241. 66 67.               |
| 7                               | Gilmore<br>Lathrop         | 3                | 3 x234<br>6 x634                              | 800<br>375    | 92         | 3 2      | J. S.<br>Opt.               |                | Two-Cy                     | cle Mot         | ors Ove                                | er 20 F        | lorse               |                |                           |
| 7                               | Mohawk                     | 1                | 436x436                                       | 900           | 275        | Opt.     | Opt.                        | Rated          | Motor                      | No. of<br>Cyls. | Bore &<br>Stroke                       | R.P.M.         | Wt.                 | 2 or 3<br>Port | Ignition                  |
| 77                              | Mehawk<br>Ontario          | 1                | 31/2×31/4<br>5 ×5                             | 900<br>450    | 215<br>340 | Opt.     | Opt.<br>J. S.               | H. P.          | Mohawk                     | 3               | 436x336                                | 1,200          | 290<br>740          | Opt.           | Opt.                      |
| 736                             | Toledo<br>Guarantee        |                  | 33/4x33/4<br>5 x5                             | 750<br>500    | 200<br>500 | 2 2      | Opt.<br>L. S.               | 21<br>24       | Ontario<br>Acadia          | 3               | 5 x5<br>5½x6<br>6½x6¼                  | 600<br>500     | 900                 | 3 2            | J. S<br>J. S.             |
| 716<br>716<br>716<br>716<br>716 | Mianus<br>Knox             | 1                | 5 4x6<br>5 2x6 4                              | 450<br>500    | 490<br>425 | 2 2      | J. S.<br>M. & B.<br>Opt.    | 24<br>24       | Barber<br>Kahlenberg       | 2 2             | 61/2×61/4<br>61/2×7                    | 500<br>350     | 695<br>1,300        | 3 2            | M. & B.                   |
| 735                             | Palmer                     |                  | 6 x6  | 400           | 375        | 2        | M. & B.                     | 24             | Lathrop                    | 2 4             | 734×734                                | 275<br>700     | 775                 | Opt.           | Opt.<br>Opt.              |
|                                 | 8 to 11 H                  | Invento          | augy 7  | rano-Ca       | cle M      | ators    |                             | 25<br>25<br>27 | Mohawk<br>Pierce-Budd      | 3               | 436x436<br>4 x4                        | 1,800          | 240                 | Opt.           | J. S.<br>J. S.            |
| Rate                            |                            | No. of           |   | wo-cy         | C 86 292   | 2 or 3   |                             | 27 28          | Barber<br>Ontario          | 3 4             | 53/4x53/4<br>5 x5                      | 550<br>600     | 675<br>990          | 3              | J. S.                     |
| H. P.                           | Motor                      |                  | Stroke  | R.P.M         |            | Port     | Ignition                    | 30             | American<br>Brown Talbot   | 4 2             | 4%x436                                 | 1,000<br>350   | 1,000               | 2 2            | ]. S.<br>]. S.            |
| 8                               | Acadia<br>Acadia           |                  | 535x6<br>4 x4                                 | 600<br>650    | 390<br>285 | 2 2      | J. S.<br>M. & B.            | 30             | Caille                     | 4               | 454×456                                | 1,000          | 1,100               | 2 3            | ]. S.<br>]. S.            |
| 8                               | American<br>American       | 1 2              | 514×5<br>374×314                              | 500 ·<br>800  | 335<br>280 | 2        | J. S.                       | 30             | Imperial<br>Mohawk         | 3               | 534x6<br>434x434                       | 1,200          | 495                 | Opt.           | Opt.                      |
| 8 8                             | Barber<br>Barber           | 2 2 3            | 4 ×4  | 600<br>750    | 270<br>190 | 3        | J. S.<br>J. S.<br>J. S.     | 36<br>36       | Barber<br>Kahlenberg       | 3 2 3           | 635×634<br>734×8                       | 500<br>325     | 925<br>2,000        | 3<br>2<br>2    | J. S.<br>M. & B.          |
| 8                               | Barker                     | 2<br>ta 2        | 3½ x3½<br>4½x5<br>4½x4                        | 400           | 380        |          | M. & B.<br>B.               | 36<br>36       | Kahlenberg<br>Lathrop      | 3               | 634x7<br>734x734                       | 325<br>275     | 1,700               | 2 2            | M. & B.<br>J. S.<br>J. S. |
| 8                               | Cady of Canasto<br>Caille  | 1                | 054 XD  | 700<br>500    | 240<br>335 | 3 2      | J. S.<br>J. S.              | 40             | Barber                     | 2               | 8 x8<br>5 x5                           | 350<br>1,250   | 1,950<br>532        | 3              | J. S.<br>J. S.            |
| 8                               | Caille<br>Gray             | 2 2              | 31/4×31/4                                     | 800<br>800    | 280<br>275 | 3        | J. S.                       | 40             | Emerson<br>Pierce-Budd     | 4               | 4 x4                                   | 1,800          | 300                 | Opt.           | M.                        |
| 8                               | Greenport<br>Greenport     | 1 2              | 6 x634<br>4%x5                                | 400<br>500    | 579<br>525 | 2 2      | J. S.<br>M. & B.<br>M. & B. | 45<br>45       | Emerson<br>Kahlenberg      | 4 3             | 5 x5<br>7 x8                           | 325            | $\frac{250}{2,600}$ | 3 2            | J. S.<br>M. & B.          |
| 8                               | Hartford                   | 1                | 41/4×41/4<br>51/4×6                           | 700           | 240        | . 2      | M. & B.                     | 54             | Kahlenberg                 | 3 2             | 7%x8<br>9 x10                          | 325<br>300     | 2,800<br>3,400      | 2 2            | M. & B.<br>M. & B.        |
| 8                               | Kahlenberg<br>Kahlenberg   | 1 2 1            | 9 19  | 220           | 550<br>350 | 2 2 2    | M. & B.<br>M. & B.          | 55<br>60       | Kahlenberg<br>Barber       | 3               | 8 x8                                   | 350<br>2,000   | 2,850<br>450        | 3              | J. S.                     |
| 8                               | Lathrop<br>L-A             | 9                | 636×636<br>4 ×4                               | 375<br>750    | 305        | 2 2      | Opt.<br>Opt.                | 60<br>70       | Pierce-Budd<br>Emerson     | 6               | 4 x4<br>5 x5                           | 1,850          | 300                 | - 3            | J. S.<br>M. & B.          |
| 8                               | Motorgo                    | 2 2              | 4 x4  | 750           | 222        | 2        | В.                          | 85             | Kahlenberg                 | 3               | 9 x10                                  | 300            | 5,000               | 2              | м. & в.                   |
| 9                               | St. Lawrence<br>Barber     | 1                | 314x4<br>514x514                              | 900<br>550    | 190<br>270 | 3        | Opt.<br>J. S.<br>M. & B.    | 11             | D                          | etachab         | le Outb                                | oard A         | lotor.              | S              |                           |
| 9                               | Bridgeport<br>Knox         | 2 2              | 436x5<br>434x436                              | 500<br>550    | 450<br>380 |          | Opt.                        |                | 2 or 4                     | No. o           | f Bore &                               |                |                     | Ports o        |                           |
| 9                               | Ontario<br>Acadia          | 2<br>2<br>3<br>2 | 314x314<br>414x5                              |               | 320<br>450 | 3 2      | Opt.<br>M. & B.             | H. P.          |                            |                 | Stroke 25% x 21/2                      | R.P.M<br>800   | 73                  | 2              | M.                        |
| 10<br>10                        | Acadia                     | 2                | 4 x4<br>61/4x8                                | 750           | 285        | 2 2      | J. S.<br>M. & B.            | 2              | 2 Gilmore<br>2 Gierhol     | 1               | 256 x 21/2<br>234 x 21/2<br>234 x 21/2 | 900<br>800     | 59<br>50            | 2              | J. S.<br>M.               |
| 10                              | Barker<br>Brown Talbot     | 2                | 536×5   | 350<br>500    | 510<br>350 | 2        | J. S.                       | 2 2            | 2 Joymot                   | or 1            | 25/8×3                                 | 850<br>800     | 85<br>70            | 2              | M.<br>M.                  |
| 10                              | Brown Talbot<br>Capital    | 2 2              | 4 x4<br>336x334                               | 750<br>1,200  | 300<br>160 | 3        | J. S.<br>J. S.<br>J. S.     | 2 2            | 2 Motorg                   | od-Ash 1        | 2%x3<br>2%x2%<br>2%x2%                 | 850<br>850     | 70                  | 2              | M.<br>B. or M.            |
| 10<br>10                        | Emerson                    | 1 2              | 5 x5  | 1,250         | 55<br>262  | 3        | J. S.<br>J. S.<br>J. S.     | 3              | 2 Wiscon<br>2 Aeroth       | sin I           | 2%x2\%<br>2\%x2\%<br>2\%x3             | 1,600          | 50<br>85            | 2              | J. S.<br>M.               |
| 10                              | Frazer Adams<br>Gilmore    | 4                | 3% x4 %<br>3 x2 %                             | 800           | 127        | 3        | J. S.<br>M. & B.            | 3              | 4 Airdriv                  | e 2             | 2%x3<br>2%x2%                          | 1,800          | 67<br>80            | L              | M.<br>M.                  |
| 10                              | Greenport<br>Hartford      | 1                | 5 x534  | 700           | 625<br>310 | 2 2      | M. & B.                     | 3314           | 2 Koban<br>2 Evinru        | de 1            | 314x3                                  | 700            | 116                 | 2              | M.<br>M.                  |
| 10                              | Imperial<br>Imperial       | 1 2              | 534x6   | 500<br>500    | 420<br>825 | 3        | J. S.                       | 333            | 2 Wiscon<br>4 Evinru       | de 2            | 314 x314<br>214 x214                   | 700<br>750     | 100<br>99           | L              | M.                        |
| 10                              | Lathrop                    | 1                | 7 x734  | 300           | 815        | 2 2      | Opt.<br>M. & B.             | 4              | 2 Amphie<br>2 Aeroth       | on 2            | 236x236                                | 1,200<br>1,300 | 80<br>125           | 2              | M.<br>J. S.<br>M.         |
| 10                              | Mianus<br>Mianus           | 2                | 636x7<br>456x5                                | 375<br>500    | 580        | 2        | M. & B.                     | 10             | 4 Airdriv                  |                 | 4 x4                                   | 1,400          | 122                 | Н              | М.                        |

# A Year's Progress in Marine Motors

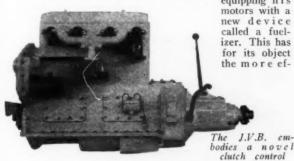
Marine Manufacturers Keep Pace With the Demand For Improvements in High Grade Motors

By F. W. Horenburger

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URING the past year many steps forward have been taken by all the leading marine motor manufacturers. The principal demand for improvement has been for some form of vaporizing device to enable motors to operate successfully and efficiently on the low grade fuels which are now so prevalent. All up-to-the-minute manufacturers have taken cognizance of this need and many are the devices produced to meet it.

One of the most prominent motor manufacturers is equipping his



fective vaporization of low grade fuels. One of the main causes of poor operation has always been the condensation of fuel particles on the relatively cool manifold walls. This fault is particularly troublesome at low speeds when the gas velocities are low. Solid slugs of rich mixture are drawn into the manifold and cylinders and poor firing is the natural result. The saturated mixture fed to the cylinders is also responsible for much of the spark plug fouling. One of the most annoying features of this poor fuel is the dilution of the lubricating oil which inevitably occurs. This is caused by condensate from the fuel mixture getting past the pistons into the crankcase where it contaminates the lubricant and destroys its viscosity. The result from this is that bearings are burned and cylinder walls scored.

Many suggestions have been offered to remedy these difficulties, among them electrical and hot water heating devices on the carbureter and manifolds. Electrical devices have proved impractical on account of the drain on the battery, and hot water or other devices depending on the heat from the exhaust are also deficient since the greatest heat is required when the engine is running throttled down and it is at this time that the heat produced by the motor is at a minimum.

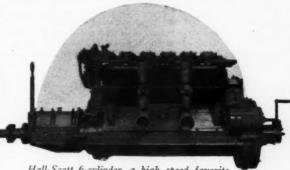
The new device referred to previously draws a small amount of fuel from a small carbureter adjacent to the

main one. This gas is passed through a special burner and ignited by means of a spark plug. The heat from this flame, which resembles a bunsen burner, heats the distribution point in the manifold with the result that the mixture inside the manifold is thoroughwarmed and combustible. At low throttle speeds this arrangement is particularly effective and practical. At higher speeds it is not so essential on account of the greater gas velocity through the manifolds. This development is perhaps typical of the advance along this line and shows that the manufacturer

is doing what he can to remedy the fuel situation. Another prominent manufacturer has made improvements in the oiling system used on his product. contained in a readily accessible double gear pump. One set of gears pumps the oil from the crankcase to an oilcooling tank separate from the engine. This tank holds a large quantity of oil kept at a low temperature by copper cooling coils through which the cooling water passes on its way from the water intake to the motor. The other set of gears in this pump draws the oil from the cooling tank and forces it under high pressure through the hollow crankshaft from which it is distributed by suitable ducts to the various bearings. Oil is also distributed to the cam shaft under pressure and allowed to drain back naturally to the crankcase. It is largely on account of a well designed oiling system that the modern high speed marine motors are enabled to keep in operation for many hours at a time

without showing any signs of distress.

Much attention is being paid to the balance of reciprocating parts. Crankshafts in particular come in for atten-

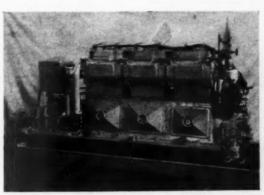


Hall-Scott 6-cylinder, a high speed favorite

tion in this direction. Four-cylinder motors are enabled to operate at high speeds with no periodic vibration which would surely be the case if any unequal distribution of weights existed.

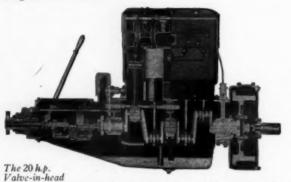
Special alloy steels are being used in greater volume than ever before. Heat treatment of metals is to-day an exact science. The electric furnace and the oil-fired furnace with thermostatic temperature control enable the operator to apply the exact amount of heat to the parts and maintain the required temperatures to a nicety. Methods to-day are different from the days when the operator's personal skill was entirely responsible for the successful treating of metals.

Not alone are special steels used but cast iron for the cylinder walls must have certain well established physical properties. The fact that it is cast iron is not sufficient. vital points are, what is the carbon content? How much sulphur, how much phosphorus, how much manganese? The physical properties of cast iron can be varied from a soft gray variety to a hard white variety with no other difference than varying proportions of the constituent elements. The modern manufacturer specifies exactly what percentage of each he requires for his castings with the result



The latest model Winton gasoline motor

that he has few failures to explain later. Where particular lightness is an essential, as in racing machines, etc., aluminum alloys are used for pistons. This metal was experimented with extensively during the war and it is possible to-day to alloy aluminum with other elements and produce perfect castings with the strength of steel and the light weight of the aluminum.



Other makers are producing new models of medium power ranges for which there is the greatest demand. new motor which is to be unveiled at the coming Motor Boat Show at Grand Central Palace incorporates many of the most advanced ideas in marine engineering. For example, the cylinder head casting is to be removable and a number of heat treated studs are provided to draw the head uniformly to the asbestos and copper gasket thus insuring a tight fit. A drop forged crankshaft of the three bearing type is provided. Great strength and freedom from vibration is assured by the size and careful workmanship of the

Knox will be shown for the first time at the coming show

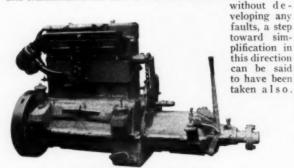
bearing surfaces. necting rods are Condrop of alloy steel forgings designed and heat treated to give the maximum strength with the minimum weight. All moving parts are machined to a uniform weight as well as dimension so that all parts are in perfect balance with each other. Wrist pins are of the maximum possible size. Were their diameter to be

increased by as slight an amount as an eighth of an inch the bearing area would actually be found to be less. To provide the utmost efficiency in the power plant overhead valves are used. All valves are made with generous dimensions and material has not been spared in these essential places. All valve operating mechanism is fully enclosed and driven from a The rocker arms are special heat single camshaft. treated alloy steels and rotate on hardened bearings lubricated by the pressure system. Water passages in the manifolds are of ample size and very free. The method of circulating the water is new. The cold water enters the



under side of the exhaust manifold leaving at the top. It enters the cylinder water jacket at the lowest point, passes upward and leaves at the cylinder head. Thus the exhaust manifold is cooled more and the cylinders receive hot water at a more uniform and efficient temperature than if cold water entered the cylinders directly. A stuffing box is provided on the end of the reverse gear case and keeps the oil in and the water out. This feature has been much neglected and has been found heretofore on only the most expensive motors.

To-day's motor boat user is looking for a complete power The old days when an engine was sold as a mere plant. cylinder and flywheel are past. A fully found plant which can be installed and will function with as little trouble as the modern automobile is what is wanted. The use of roller bearings is increasing as well as the use of overhead valves. A novel feature on one well known brand of motor is the introduction of a sliding gear transmission with an enclosed type of clutch which is radically different from the conventional marine reverse gear and clutch. this transmission has been tested and tried in actual service



A new model Erd in a popular size

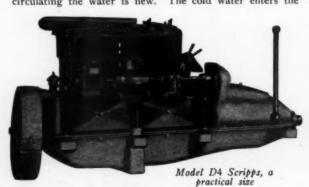
The use of engines of the completely standardized type has done much to make the standardized stock boat a real-Many of these are to-day sailing about and are successful mainly on account of the pioneer work done by the motor manufacturers.

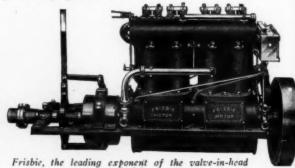
Small engines too are a necessity and low power plants which are built in a durable, substantial fashion are being readily absorbed throughout the country. New boats are constantly being built and older ones being fitted with

Electrical equipment is also being improved. and lighting generators are being fitted to most motors and magneto ignition in some form or other is practically universal.

Accessibility of parts, and facility in taking down, have also come in for attention. No longer is a handhold plate on the side of a motor made the size of a postage stamp. One can really get his hand and a wrench inside in case it is necessary to take up on a bearing or otherwise adjust the interior.

It is evident the marine motor manufacturers have not been standing still. Progress is apparent in all directions and the increasing flood of orders for American motors in large and small sizes from near and far markets attest their popularity. The manufacturer who has been on the job is reaping his reward.





Frisbie, the leading exponent of the valve-in-head principle

# American Manufacturers of Four-Cycle Motors

An Alphabetical List of Four-Cycle Marine Motors with the Name and Addresses of Their Manufacturers, Giving the Range of Powers Produced by Each

| Four-Cvc              | le Gasoline and Kerosene Engines   |
|-----------------------|--|
| Acme                  | Acme Engine Co., 163 Main St., San Francisco, Cal. 8, 10, 16, 20, 25, 27, 85, 40, 45, 50, 55, 65, 80, 85, 100, 125   |
| Acadia                | Acadia Gas Engines, Ltd., Bridgewater, N. S., Canada.  |
| American              | H. P. 1-0 cyts.<br>Acadia Gas Engines, Ltd., Bridgewater, N. S., Canada.<br>10, 15, 18, 20, 30, 40 H. P. 1-4 cyts.<br>American Engine Co., Detroit, Mich.  |
| Anderson              | 14 H. P. 4 cyls.<br>Anderson Engine Co., 4032 N. Rockwell St., Chicago, Ill.   |
| Aristocrat            | 4, 8, 12, 24, 50 H. P. 1-4 cyls.<br>Caille Perfection Motor Co., Detroit, Mich.  |
| Automatic             | 14 H. P. 4 cyls. The Automatic Machine Co., Bridgeport, Conn.  |
| Atlas Imperial        | 14 H. P. 4 cyls. Anderson Engine Co., 4032 N. Rockwell St., Chicago, Ill. 4, 8, 12, 24, 50 H. P. 1-4 cyls. Callle Perfection Motor Co., Detroit, Mich. 14 H. P. 4 cyls. The Automatic Machine Co., Bridgeport, Conn. 3, 6, 9, 12, 18, 24, 25, 37, 50, 75, 100 H. P. 1-6 cyls. Atlas Imperial Eng. Co., Ft. 19th Ave., Oakland, Cal. 6, 8, 10, 12, 16, 20, 30, 35, 45, 50, 55, 60, 80, 90, 110, 125, 150 H. P. 1-4 cyls. Barber Bros., King Bros., Successors, Syracuse, N. Y. 3 H. P. 1 cyl.   |
| Barber                | 150 H. P. 1-4 cyls.<br>Barber Bros., King Bros., Successors, Syracuse, N. Y.   |
| Boyer                 | 3 H. P. 1 cyl.<br>Boyer Machine Co., East Oakland, Cal.  |
| Brennan               | 5, 10 H. P. 1-2 cyls. Brennan Motor Mfg. Co., Syracuse, N. Y.  |
| Bridgeport            | 20, 35, 40, 50, 60, 80 H. P. 4-6 cyls.<br>Bridgeport Motor Co., Inc., Bridgeport, Conn.  |
| Buffalo               | 130 H. P. 1-4 cyls. Barber Bros., King Bros., Successors, Syracuse, N. Y. 3 H. P. 1 cyl. Boyer Machine Co., East Oakland, Cal. 5, 10 H. P. 1-2 cyls. Brennan Motor Mig. Co., Syracuse, N. Y. 20, 35, 40, 50, 60, 80 H. P. 4-6 cyls. Bridgeport Motor Co., Inc., Bridgeport, Conn. 14, 30, 45, 60 H. P. 2-4 cyls. Buffalo Gasoline Motor Co., Buffalo, N. Y. 12, 13, 20, 22, 24, 30, 45, 60, 70, 80, 100, 150 H. P. 2-6 cyls. C. N. Cady Co., Inc., Canastota, N. Y. 16 H. P. 4 cyls. Caille Perfection Motor Co., Detroit, Mich. 14 H. P. 4 cyls. Fifield Bros. Co., Augusta, Me. 3, 6, 7, 10, 12, 15, 18, 20, 30 H. P. 1-3 cyls. Carl Engine Wiss., 103 N. 2nd St., Philadelphia, Pa. 4, 5, 8, 11, 16, 18, 24, 36 H. P. 1-4 cyls. Carson Motor Co., 616 Penobscot Bldg., Detroit, Mich. 15 H. P. 4 cyls.  |
| Cady of Canastota     | C. N. Cady Co., Inc., Canastota, N. Y.   |
| Caille                | 16 H. P. 4 cyls.<br>Caille Perfection Motor Co., Detroit, Mich.  |
| Capital               | 14 H. P. 4 cyls.<br>Fifield Bros. Co., Augusta, Me.  |
| Carl                  | 3, 6, 7, 10, 12, 15, 18, 20, 30 H. P. 1-3 cyls.<br>Carl Engine Wks., 103 N. 2nd St., Philadelphia, Pa.   |
| Carson                | 4, 5, 8, 11, 16, 18, 24, 36 H. P. 1-4 cyls.<br>Carson Motor Co., 616 Penobscot Bldg., Detroit, Mich.   |
| Chesapeake            | 15 H. P. 4 cyls.<br>Chesapeake Engine Co., Oxford, Md.   |
| Doak                  | 7 H. P. 1 cyl.  Doak Gas Engine Co., Oakland, Cal.   |
| Doman                 | 30, 40, 45, 60, 75, 90, 100, 150, 200, 300 H. P. 2-6 cyls.   |
| Duen                  | 4, 7, 15, 25, 40, 50 H. P. 1-4 cyls.   |
| du Pont               | 2, 4, 6, 8, 12, 16, 24 H. P. 1-6 cyls.   |
| Floo                  | To H. P. 4 cyls. Chesapeake Engine Co., Oxford, Md. 7 H. P. 1 cyl. Doak Gas Engine Co., Oafland, Cal. 30, 40, 45, 60, 75, 90, 100, 150, 200, 300 H. P. 2-6 cyls. Universal Products Co., Oshkosh, Wis. 4, 7, 15, 25, 40, 50 H. P. 1-4 cyls. Dunn Motor Wks., Ozdensburg, N. Y. 2, 4, 6, 8, 12, 16, 24 H. P. 1-6 cyls. du Pont Motors, Inc., Commerce St., Wilmington, Del. 20, 40, 60 H. P. 2-6 cyls. The Elec Co., Bayonne, N. J. 65, 100 H. P. 4-6 cyls. Enterprise Foundry Co., Southern Pacific Bldg., San   |
| Enterorise            | 65, 100 H. P. 4-6 cyls.<br>Enterprise Foundry Co., Southern Pacific Bldg., San   |
| Enterprise            | Francisco, Cal.  |
| Erd                   | 6, 5, 10, 12, 10, 20, 30, 33, 43, 33, 50, 60 H. F. 1-3 Cyts.  Erd Motor Co., Saginaw, Mich.  |
| Evansville            | Francisco, C. 10, 20, 30, 35, 45, 55, 60, 80 H. P. 1-3 cyls. Erd Motor Co., Saginaw, Mich. 20, 30, 40, 45 H. P. 4 cyls. Evansyille Gas Engine Wks., 1230 Riverside Ave., Evans-  |
| P & B                 | 334, 5, 734, 8, 10, 15, 16, 20, 24, 32 H. P. 1-4 cyls.   |
| Plebermen             | 17, 40, 45, 50, 65 H. P. 4-6 cyls.   |
| Fisherman             | 4, 6, 12, 18, 24 H. P. 1-4 cyls.   |
| Frieble (Volve to be  | Ont., Can. 20, 40, 60 H. P. 2-6 cyls.  |
| Prisone (varve-in-nec | 5, 7, 10, 16, 18, 25, 30, 40, 50, 75 H. P. 1-6 cyls.   |
| Frisco Standarg       | Evansville Gas Engine Wks., 1230 Riverside Ave., Evansville, Ind. 334, 5, 734, 8, 10, 15, 16, 20, 24, 32 H. P. 1-4 cyls. Fay & Bowen Engine Co., Geneva, N. Y. 17, 40, 45, 50, 65 H. P. 4-6 cyls. Loane Engineering Co., Baltimore, Md. 4, 12, 18, 24 H. P. 1-4 cyls. Foreman Motor & Machine Co., Ltd., Lake St., Toronto, Ont., Co., 20, 40, 60 H. P. 2-6 cyls. 40, 17 Frisbie Motor Co., Middletown, Conn. 5, 7, 10, 16, 18, 25, 30, 40, 50, 75 H. P. 1-6 cyls. Standard Gas Engine Co., Oakland, Cal. 5, 8, 10, 12, 16, 20, 23, 30, 40, 60, 65, 80, 85, 110, 120, 175 H. P. 1-4 cyls. Gaeth Motors Co., 2101 Abbay Ave., Cleveland, O.   |
| Gaeth                 | Gaeth Motors Co., 2101 Abbey Ave., Cleveland, O.   |
| Callin                | 18, 27, 36, 50, 54, 75 H. P. 2-6 cyis.   |
| Gilmore               | 12 H. F. 4 cyls. Gilmore Marine Motor Corp., 404 24th St., Detroit, Mich. 5, 10 H. P. 24 cyls. Gray & Prior Machine Co., 56 Suffield St., Hartford, Conn. 36 H. P. 4 cyls.   |
| Gray-Prior            | 5, 10 H. P. 2-4 cyls.<br>Gray & Prior Machine Co., 56 Suffield St., Hartford,  |
| Gray                  | Conn. Gray Motor Co., 2108 Mack Ave., Detroit, Mich.   |
| Guarantee             | Cons.  Cons.  Gray Motor Co., 2108 Mack Ave., Detroit, Mich.  25, 35, 45 H. P. 4 cyls.  Guarantee Motor Co., 300 Bay St., North, Hamilton, Ont., Can.  34, 6, 8, 10, 12, 16, 20, 25, 50 H. P. 1-4 cyls.  Hall Scott Motor Car Co., Inc., Berkeley, Cal.  125, 200 H. P. 4-6 cyls.  H. L. Brownback Co., Norristown, Pa.  4 H. P. 2 cyls.  Harris Marine Engine Co., 205 West Front St., Wilmington, Delta  |
| ****                  | Ont., Can.<br>314, 6, 8, 10, 12, 16, 20, 25, 50 H. P. 1-4 cyls.  |
| Hall-Scott            | Hall Scott Motor Car Co., Inc., Berkeley, Cal.<br>125, 200 H. P. 4-6 cyls.   |
| H. L. B               | H. L. Brownback Co., Norristown, Pa. 4 H. P. 2 cyls.   |
| Harris                | . Harris Marine Engine Co., 205 West Front St., Wilmington, Del.   |
| Hess                  | 10, 15, 18, 30, 50, 70, 100, 115, 175 H. P. 2-6 cyls.<br>Hess Motor Co., Inc., 120 Sherman St., Detroit, Mich.   |
| Hettinger             | 5 H. P. 4 cyls.<br>Hettinger Engine Co., Bridgeton, N. J.  |
| Hicks                 | 6, 9, 12, 18, 25, 36, 50 H. P. 1-4 cyls.<br>Hicks Iron Wks., 967 Howard St., San Francisco, Cal.   |
| Honest Clay           | 6, 8, 10, 12, 16, 20, 30, 35, 80 H. P. 1-3 cyls.<br>The Clay Engine Mfg. Co., 664 E. 72nd St., Cleveland, O.   |
| Hunter                | 4, 6, 8, 10, 12, 16, 20, 25, 35, 50, 100 H. P. 1-4 cyls.<br>Everett Hunter Boat Co., McHenry, Ill.   |
| J. V. B               | 10, 12, 20 H. P. 4 cyls.<br>J. V. B. Engine Co., 5912 Central Ave., Cleveland, O.  |
| Kermath               | 40, 60 H. P. 4 cyls.<br>Kermath Mfg. Co., Detroit, Mich.   |
| Knox                  | 12, 18, 25, 40 H. P. 4 cyls.   |
| Knox (Valve-in-Hear   | 4 H. P. 2 cyls.  Harris Marine Engine Co., 205 West Front St., Wilmington, Del.  10, 15, 18, 30, 50, 70, 100, 115, 175 H. P. 2-6 cyls.  Hess Motor Co., Inc., 120 Sherman St., Detroit, Mich.  5 H. P. 4 cyls.  Hettinger Engine Co., Bridgeton, N. J.  6, 9, 12, 18, 25, 36, 50 H. P. 1-4 cyls.  Hicks Iron Wks., 967 Howard St., San Francisco, Cal.  6, 8, 10, 12, 16, 20, 30, 35, 80 H. P. 1-3 cyls.  The Clay Engine Mig. Co., 664 E. 72nd St., Cleveland, O.  4, 6, 8, 10, 12, 16, 20, 25, 35, 50, 100 H. P. 1-4 cyls.  Everett Hunter Boat Co., McHenry, Ill.  10, 12, 20 H. P. 4 cyls.  J. V. B. Engine Co., 5912 Central Ave., Cleveland, O.  40, 60 H. P. 4 cyls.  Legan Mig. Co., Detroit, Mich.  12, 18, 25, 40 H. P. 4 cyls.  Camden Anchor-Rockland Machine Co., Camden, Me.  6, 8, 12, 16, 25, 50, 75 H. P. 1-6 cyls.  30-40 H. P. 4 cyls.  J. W. Lathrop Co., Mystic, Conn.  12, 16, 21, 23, 30, 40 H. P. 2-4 cyls.  LeRoi Co., Michell St. and 60th Ave., Milwaukee, Wis.  9-12 H. P. 4 cyls. |
| Lathron               | 20-40 H. P. 4 cyls.  |
| LeRoi                 | 12, 16, 21, 28, 30, 40 H. P. 2-4 cyls.   |
|                       | 9-12 H. P. 4 cyls.   |

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| Lewis Ultra Six     | Lewis Motor Mfg. Co., Fostoria, O. 30 H. P. 6 cyls. A. G. Hebgen, 440 Market St., San Francisco, Cal. 3½, 3 H. P. 1-2 cyls. Murray & Tregurtha Corp., Atlantic, Mass. 15, 28, 49, 69, 100, 400 H. P. 2 cyls. Mulanus Motor Wks., Stamford, Conn. 16, 24, 32 H. P. 2-4 cyls. Miller Engine Co., 2329 N. Talman Ave., Chicago, Ill. 4, 6, 10, 14, 20, 22, 30, 35, 50 H. P. 1-4 cyls. Kilger Engine Co., 2329 N. Talman Ave., Chicago, Ill. 16 H. P. 4 cyls. Niagara Motors Corp., Dunkirk, N. Y. 12, 35, 80, 120, 160 H. P. 2-8 cyls. J. E. Nieland Co., 1728 Bryant St., San Francisco, Cal. 1½, 2, 2½, 4, 6, 8, 12, 16, 18, 20, 24 H. P. 1-3 cyls. N. & S. Engine Co., 144 Elliott Ave., Seattle, Wash. 20, 30, 40, 80 H. P. 2-6 cyls. Woodhouse Gasoline Engine Co., Seattle, Wash. 4, 8 H. P. 1-2 cyls. Pacific Marine Engine Co., 78 Marion St., Seattle, Wash. 7 H. P. 1 cyl. Palmer Brox. Engines, Inc., Cos Cob, Conn. 3½, 4½, 5, 6, 6½, 7, 11, 12, 15, 18, 20, 24, 25, 26, 35, 50, 60, 80 H. P. 1-6 cyls. Peerless Marine Motor Corp., 2150 Niagara St., Buffalo, N. Y. 6, 12, 20, 24, 35, 50 H. P. 1-4 cyls. Central Machine Co., 77th St. and Wood, Philadelphia, Pa. 8, 16 H. P. 1-2 cyls. |
| Liberty Kid         | A. G. Hebgen, 440 Market St., San Francisco, Cal.  |
| M & T               | Murray & Tregurtha Corp., Atlantic, Mass.  |
| Mianus              | 18, 28, 40, 60, 100, 400 H. P. 2 cyls.<br>Mianus Motor Wks., Stamford, Conn.   |
| Miller              | 16, 24, 32 H. P. 2-4 cyls.<br>Miller Engine Co., 2329 N. Talman Ave., Chicago, Ill.  |
| Motordo             | 4, 6, 10, 14, 20, 22, 30, 35, 50 H. P. 1-4 cyls.   |
| Niedere             | 16 H. P. 4 cyls.   |
| Nieland             | 12, 35, 80, 120, 160 H. P. 2-8 cyls.   |
| Nieland             | 1½, 2, 2½, 4, 6, 8, 12, 16, 18, 20, 24 H. P. 1-3 cyls.   |
| N & S               | N. & S. Engine Co., 1144 Elliott Ave., Seattle, Wash.<br>20, 30, 40, 80 H. P. 2-6 cyls.  |
| Olympic             | Woodhouse Gasoline Engine Co., Seattle, Wash.<br>4, 8 H. P. 1-2 cyls.  |
| Pacific Heavy-Duty. | Pacific Marine Engine Co., 78 Marion St., Seattle, Wash.<br>7 H. P. 1 cvl.   |
| Palmer              | Palmer Bros. Engines, Inc., Cos Cob, Conn.   |
| Passiass            | 60, 80 H. P. 1-6 cyls.   |
| Pt. II. d. L. L. L. | N. Y. 6, 12, 20, 24, 35, 50 H. P. 1-4 cyls.  |
| Philadelphia        | 8, 16 H. P. 1-2 cyls.  |
| Red Wing            | Red Wing Motor Co., Red Wing, Minn.<br>14, 20, 24, 36, 40 H. P. 4 cyls.  |
| Regal               | Regal Gasoline Engine Co., Coldwater, Mich.<br>2, 4, 5, 7, 8, 9, 10, 14, 18, 20, 30, 32, 36, 50 H. P. 1-4 cvls.  |
| Reliable Heer       | Reliable Tractor & Engine Co., Portsmouth, O.  |
| Roberts             | Roberts Motor Co., 131 Arthur St., Sandusky, O.  |
| Scripps             | Scripps Motor Co., 631 Lincoln Ave., Detroit, Mich.  |
| Seattle Standard    | Seattle Standard Eng. Mfg. Co., 821 Western Ave.,  |
| Speedway            | Central Machine Co., 7th St. and Wood, Philadelphia, Pa. 8, 16 H. P. 1-2 cyls. Red Wing Motor Co., Red Wing, Minn. 14, 20, 24, 36, 40 H. P. 4 cyls. Regal Gasoline Engine Co., Coldwater, Mich. 2, 4, 5, 7, 8, 9, 10, 14, 18, 20, 30, 32, 36, 50 H. P. 1-4 cyls. Reliable Tractor & Engine Co., Portsmouth, O. 10, 16, 20, 25, 32, 45, 55 H. P. 2 cyls. opposed. Roberts Motor Co., 131 Arthur St., Sandusky, O. 8 H. P. 2 cyls. Scripps Motor Co., 631 Lincoln Ave., Detroit, Mich. 18, 35, 45, 50, 75 H. P. 2-6 cyls. Seattle Standard Eng. Mfg. Co., 821 Western Ave., Seattle, Wash. 4, 7, 8, 15, 20 H. P. 1-2 cyls. Consolidated Shipbuilding Corp., Morris Heights, N. Y. 28, 44, 66, 75, 115, 130, 150, 160, 160, 175, 200, 250 H. P. 4-8 cyls. Standard Motor Construction Co., 172 Whiton St., Jersey   |
| Standard            | Standard Motor Construction Co., 172 Whiton St., Jersey  |
|                     | 12, 18, 24, 27, 37, 54, 60, 75, 90, 100, 150, 220, 300, 500  |
| Sterling            | 25, 44, 60, 75, 115, 130, 100, 100, 175, 200, 200 H. P. 4-8 cyls. Standard Motor Construction Co., 172 Whiton St., Jersey City, N. J. 12, 18, 24, 27, 37, 54, 60, 75, 90, 100, 150, 220, 300, 500 H. P. 2-6 cyls. Sterling Engine Co., 1252 Niagara St., Buffalo, N. Y. 10, 15, 25, 55, 85, 100, 115, 125, 145, 150, 170, 200, 225, 250, 300 H. P. 2-8 cyls. D. F. Sturtevant Co., Hyde Park, Boston, Mass. 75 H. P. 4 cyls. Superior Motor Works, Jackson, Mich. 6, 12, 25 H. P. 1-4 cyls. Trego Motors Corp., New Haven, Conn. 28 H. P. 2 cyls. Treiber Engine Co., Yonkers, N. Y. 35 H. P. 4 cyls. New York Yacht, Launch & Engine Co., Morris Heights, N. Y. Union Gas Engine Co., Oakland, Cal. 5, 12, 20, 35, 45, 60, 80, 85, 110, 125, 150, 225, 250, 300, 325, 375 H. P. 1-6 cyls. Universal Motor Co., Oakland, Cal. Universal Motor Co., Oaklosh, Wis. 12 H. P. 4 cyls.  |
|                     | 10, 15, 25, 55, 85, 100, 115, 125, 145, 150, 170, 200, 225, 250, 300 H. P. 2-8 cyls.   |
| Sturtevant          | 75 H. P. 4 cyls.   |
| Superior            | 6, 12, 25 H. P. 1-4 cyls.  |
| Trego Model No. 17. | Trego Motors Corp., New Haven, Conn.<br>28 H. P. 2 cyls.   |
| Treiber             | Treiber Engine Co., Yonkers, N. Y.   |
| Twentieth Century.  | New York Yacht, Launch & Engine Co., Morris Heights,   |
| Union               | Union Gas Engine Co., Oakland, Cal.  |
| Vintered .          | 325, 375 H. P. 1-6 cyls.   |
| Universal           | 12 H. P. 4 cyls.   |
| Van Bierck          | Van Blerck Motor Co., Monroe, Mich.<br>100, 150, 200 H. P. 4-8 cyls.   |
| Vulcan              | Vulcan Engine Works, 1827 Bainbridge St., Phila., Pa. 4, 5, 734, 8, 10, 11, 15, 16, 20, 22, 25, 30, 35, 40, 45, 56, 70, 75 H. P. 1-6 cyls.   |
| Waukesha            | 26, 31, 36, 40, 50 H. P. 4 cyls.   |
| Winton              | Winton Engine Wks., 2116 West 106th St., Cleveland, O. 80, 125, 150, 200 H. P. 6-8 cvls.   |
| Wisconsin           | 3.20, 3/3 H. F. 1-0 Cyls. Universal Motor Co., Oshkosh, Wis. 12 H. P. 4 cyls. Van Blerck Motor Co., Monroe, Mich. 100, 150, 200 H. F. 4-8 cyls. Vulcan Engine Works, 1827 Bainbridge St., Phila., Pa. 4, 5, 7/4, 8, 10, 11, 15, 10, 20, 22, 25, 30, 35, 40, 45, 56, 70, 75 H. P. 1-6 cyls. Waukesha Motor Co., Waukesha, Wis. 26, 31, 36, 40, 50 H. F. 4 cyls. Winton Engine Wks., 2116 West 108th St., Cleveland, O. 80, 125, 150, 200 H. F. 6-8 cyls. Wisconsin Motor Mfg. Co., Sts. A, Milwaukee, Wis. 18, 22, 24, 30, 40, 82, 46, 54, 55, 57, 62, 55, 80, 85, 90 H. P. 4-6 cyls. Wolverine Motor Wks., Bridgeport, Conn. 5, 14, 22, 32, 40, 42, 60, 30, 110, 160, 200 H. P. 1-6 cyls. Wood & Chute, Inc., Greenport, N. Y. 10, 24, 32 H. P. 2-4 cyls. Wright Machine Co., Owensboro, Ky. 10, 15, 20, 30, 40, 60, 90 H. P. 2-6 cyls.  |
| Wolverine           | Wolverine Motor Wks., Bridgeport, Conn. 5, 14, 22, 32, 40, 42, 60, 80, 110, 160, 200 H. P. 1-6 cvls.   |
| Wood & Chute        | . Wood & Chute, Inc., Greenport, N. Y.   |
| Wright Reliable     | Wright Machine Co., Owensboro, Ky.   |
|                     | 10, 10, 20, 30, 20, 00, 90 H. P. 2-0 Cyls.   |
|                     | our-Cycle Outboard Motors  |
| Airdrive            | . Kemp Machine Wks., Muncie, Ind.<br>3, 10 H. P. 2 cyls.<br>. Evigrude Motor Co., 279 Walker St., Wilwaukee, Wis.  |
| Evinrude            | Eviprude Motor Co., 279 Walker St., Wilwaukee, Wis.  |

| Airdrive | Kemp Machine Wks., Muncie, Ind.                      |
|----------|--|
|          | 3. 10 H. P. 2 cvls.                                  |
| Evinrude | Evinrude Motor Co., 279 Walker St., Wilwaukee, Wis.  |
|          | 4 H. P. 2 cvls.                                      |
| Joymotor | Adams Motor & Mfg. Co., 3914 Costello Ave., Chicago, |
|          | III 9 H. P. Levi                                     |

### Four-Cycle Heavy Oil Engine Manufacturers

| Atlas Diesel Atlas Imperial Engine Co., Oakland, Cal.   |
|---|
| 100 H. P. and up. 4-6 cyls.   |
| Dodge   |
| 12½, 25, 37½, 50, 75 H. P. 1-6 cyls.  |
| Craig James Craig Engine & Machine Works, 807 Garfield Ave  |
| Jersey City, N. J.  |
| Dow Dow Pump & Diesel Co., Alameda, Cal.  |
| 320 to 1415 H. P. 6-8 cyls.   |
| Fulton Fulton Mfg. Co., Erie, Pa.   |
| 50, 70, 100 H. P. 3-6 cvls.   |
| Ingersofl-Rand P. R. Type. Ingersoll-Rand Co., 11 Broadway, New Yor<br>N. Y. 220, 300, 500 H. P. 6 cyls       |
| Midwest Diesel Midwest Engine Co., Indianapolis, Ind. 60, 90, 120, 180 H. P. 2-6 cyls. (Continued on page 48) |
| (Continued on page 40)  |

# Four-Cycle Marine Motors for 1921

The initials used in the column under Location of Valves have the following meaning: L, both inlet and exhaust valves on same side of cylinder; T, inlet and exhaust valves on opposite sides of cylinder; H, valves in cylinder head. The initials used in the column under Ignition indicate the standard equipment furnished and have the following meanings: M & B, make and break system with battery and coil or low tension magneto; B & M, both battery and high-tension magneto system; M, high-tension magneto with impulse starter; J S, jump spark battery and coil system; B Dist., battery with distributor; Dual M, two separate high-tension magneto systems operating independently; D M D, dual magneto and distributor; D, Delco system; A. K., Atwater Kent system; Dbl, separate double systems; Opt., purchaser has the option of make and break or jump spark systems.

Location

|                | Four-Cycle                     | Mot     | ors Une                   | ler 6 H       | orsepowe         | er                                    | Rated        | No. o                                | f Bore &   |              | Locat                   |   |
|----------------|--------------------------------|---------|---------------------------|---------------|------------------|---------------------------------------|--------------|--------------------------------------|--|--------------|-------------------------|---|
|                |                                |         |                           |               | Locati           |                                       | H. P.        | Motor Cyls.                          | Stroke   | R.P.M.       | Wt. Val                 | ves Ignition                                    |
| Rated<br>H. P. |                                |         | Bore &<br>Stroke          | R.P.M.        | Wt. Valve        | s Ignition                            | 10           | Frisbie Valve-in-head 2<br>Gilmore 4 | 4%x5<br>3 x334   | 550<br>750   | 430 H<br>225 H          | . s.  |
| 136            | Nieland                        | 1       | 3 x31/2                   | 700           | L                | Opt.                                  | 10           | Guarantee 1                          | 7 ×7   | 500          | 900 L                   | J. S.   |
| 2              | Dunn<br>Nieland                | 1       | 334×4<br>334×4            | 500<br>500    | 100 L<br>275 L   | J. S.<br>Opt.                         | 10<br>10     | Harris 2<br>Hicks 1                  | 5 x516<br>716x816                                      | 450<br>400   | 550<br>1,500 H          |   |
| 2              | Regal                          | i       | 334x334                   | 800           | 125 L            | J. S.<br>M. & B.                      | 10           | Honest Clay 1                        | 736x7  | 375<br>800   | 1,040 H<br>260 L        | J. S.<br>B. & M.                                |
| 234            | Nieland<br>Automatic           | 1       | 4 x434<br>434x5           | 500<br>500    | 275 L<br>300 L   | Opt.                                  | 10           | Hunter 4<br>Miller 2                 | 234x4<br>434x6   | 600          | 625 L                   | M.  |
| 3              | Barber                         | 1       | 37583                     | 600           | 135              | 1. S:                                 | 10           | Palmer 2                             | 436x436  | 650          | 325 L<br>725 L<br>900 H | J. S.<br>J. S.                                  |
| 334            | Liberty Kid<br>Palmer          | 1       | 3%x41/9<br>41/9x41/9      | 750<br>600    | 250 T            | Opt.<br>J. S.                         | 10<br>10     | Regal 2<br>Reliable Heer 2 opp       | 43/2x53/2<br>. 5 x5                                    | 600<br>600   | 900 H                   | M.  |
| 334            | Standard Kid                   | 1       | 356 x 356                 | 750           | 110 H            | Opt.                                  | 10           | Sterling 4<br>Vulcan 2               | 2%x43%   | 1,000        | 250 L<br>950 T          | M.  |
| 4              | Evansville<br>Anderson         | 1       | 436×5<br>416×5            | 500<br>550    | 290 H<br>400 T   | J. S.                                 | 10<br>10     | Wright Reliable                      | 534x7<br>6 x734  | 450          | 1,280 H                 | J. S.<br>M. I. S.                               |
| 4              | Carl<br>Doman                  | 1       | 459x5                     | 500<br>600    | 350 L<br>200 H   | A. K.                                 |              | 11 4- 15 77                          | h E  | C.           | ala Mat                 |   |
| 4              | Dunn                           | 2       | 3%x43%                    | 600           | 215 L            | Opt.<br>J. S.<br>J. S.                |              | 11 to 15 Horse                       | power r  | our-cy       |                         |   |
| 4              | Fisherman<br>H. L. B.          | 1       | 3% x5<br>236 x5           | 550<br>1,200  | 120 H            | J. S.<br>B. D.                        | Rated        | No. o                                | f Bore &   |              | Locat                   |   |
| 4              | Honest Clay                    | î       | 434x5                     | 500           | 385 H            | I. S.<br>M.                           | H. P.        | Motor Cyla                           | Stroke   | R.P.M.       | Wt. Valv                | es Ignition                                     |
| 4              | Miller<br>Nieland              | 1       | 432x5<br>5 x6             | 600<br>400    | 410 L<br>525 L   | M. & B.                               | 11           | Carl 2<br>Palmer 2                   | 5 x6<br>43/2×6   | 500<br>600   | 650 I<br>650 T          | A. K.<br>A. K.                                  |
| 4              | Nieland                        | 2       | 336x4                     | 700           | 400 L            | J. S.                                 | 11           | Vulcan 1                             | 734×834  | 400          | 1,100                   | J. S.   |
| 4              | Olympic<br>Regal               | 1       | 334x434<br>334x434        | 700<br>700    | 265 H<br>290 L   | ]. S.                                 | 12           | Anderson 2<br>Atlas Imperial 2       | 5 x6   | 500<br>425   | 1,000 T                 | H M. & B.                                       |
| 4              | Seattle Standard               | 1       | 3%x43%                    | 900           | 190 H            | ]. S.<br>]. S.<br>]. S.               | 12           | Automatic 2                          | 536x7  | 400          | 1,110 1                 |   |
| 434            | Vulcan<br>Palmer               | 1       | 456x6<br>436x6            | 500<br>600    | 450 T<br>375 T   | J. S.                                 | 12           | Buffalo 2<br>Dunn 3                  | 5 x63/2<br>43/4x5                                      | 400<br>700   | 1,170 I<br>375 I        | J. S.<br>H M. & B.                              |
| 8              | Carl                           | - 1     | 5 x6                      | 400           | 490 L            | A. K.                                 | 12           | Enterprise 2                         | 6 x8   | 400<br>550   | 2,700                   | M. & B.   |
| 5              | Evansville<br>Frisco Standard  | 1       | 5 x6<br>5%x61/2           | 500<br>400    | 425 H<br>1,220 T | J. S.<br>M. & B.                      | 12<br>12     | Fisherman 2<br>Frisco Standard 2     | 5 x6<br>6 x7   | 380          | 2,020                   | Opt.  |
| 5              | Frisbie Valve-in-hea           | ad 1    | 4%x5                      | 550           | 325 H            | J. S.                                 | 12           | Gaffga 2                             | 5 x6<br>534x6  | 500<br>500   | 900 T                   | M.<br>J. S.                                     |
| 5              | Gilmore<br>Hess                | 1       | 3 x336<br>334x4           | 750<br>900    | 135 H<br>225 L   | M.                                    | 12           | Hettinger 2                          | 534x6  | 550          |                         | . A. K.   |
| 5              | Regal                          | 1       | 436x536                   | 600           | 380 L            | J. S.<br>M. & B.                      | 12<br>12     | Hicks 2<br>Honest Clay 2             | 6 x7   | 425<br>400   | 2,200 H                 | M. & B.<br>I J. S.                              |
| 5              | Union<br>Vulcan                | i       | 5%x63%<br>5%x7            | 400<br>500    | 640 L<br>650 T   | J. S.<br>M.                           | 12           | Hunter 4                             | 534x7<br>334x434                                       | 800          | 280                     | J. S.<br>M.                                     |
| 5              | Wolverine                      | 1       | 533x6                     | 500           | 494 L            | M.<br>M. & B.                         | 12<br>12     | Kermath 4<br>Knox 2                  | 336x4  | 1,200<br>600 | 470 I<br>950 I          | M.<br>M.<br>H. J. S.                            |
| 6              | Atlas Imperial<br>Automatic    | i       | 536×7                     | 400<br>400    | 925 H<br>643 L   | Opt.                                  | 12           | Lathrop 2                            | 5 x514<br>5 x614<br>314 x414                           | 450          |                         | Γ J. S.   |
| 6              | Automatic<br>Dunn              | 2       | 434×5<br>334×4            | 500<br>600    | 525 L            | Opt.                                  | 12<br>12     | Le Roi 4<br>Niagara 2                | 336x436<br>436x536                                     | 1,000<br>900 | 350 I<br>625            | Opt.  |
| 6              | Enterprise                     | 1       | 6 x8                      | 420           | 1,500 H          | J. S.<br>M. & B.                      | 12           | Nieland 2                            | 6 x7   | 375          | 1,200 I                 | M. & B.   |
| 6              | Fisherman<br>Guarantee         | 1       | 5 x6<br>5½x6              | 550<br>500    | 800 H<br>555 L   | J. S.                                 | 12<br>12     | Palmer 2<br>Peerless 2               | 5 x6<br>5 x6   | 600          | 600 1                   | I A. K.<br>J. S.                                |
| 6              | Hettinger                      | î       | 536x6                     | 550           | 500 L            | J. S.<br>M. & B.                      | 12           | Standard 2                           | 5 x634   | 450          | 850                     | J. S.<br>M. & B.<br>L. J. S.                    |
| 6              | Hicks<br>Honest Clay           | 1       | 6 x7<br>534x7             | 425<br>375    | 950 H<br>850 H   | M. & B.<br>J. S.                      | 12           | Superior 2<br>Union 2                | 43/2×6<br>6 ×7   | 750<br>400   |                         |   |
| 6              | Knox                           | 1       | 5 x534                    | 600           | 490 H            | J. S.                                 | 12           | Universal 4                          | 256×4  | 1,200<br>950 | 300<br>664              | . M.  |
| 6              | Miller<br>Nieland              | i       | 534x6<br>6 x734           | 500<br>350    | 500 L<br>750 L   | M.<br>M. & B.                         | 14           | American 4<br>Aristocrat 4           | 314x4<br>314x4   | 950          |                         |   |
| 6              | Nieland                        | 2       | 4 x5                      | 550           | 525 L            | M. & B.                               | 14           | Bridgeport 2                         | 53/2×63/2  | 500<br>400   | 1,200<br>650            | L M.  |
| 6              | Palmer<br>Peerless             | i       | 5 x6<br>5 x6              | 600<br>600    | 400 T<br>450 L   | }. S.<br>S.<br>S.                     | 14           | L-A 4                                | 334 x436   | 900          | ***                     | L J. S.<br>L M.                                 |
| 6              | Superior                       | 1       | 4½x6                      | 750           | L                | J. S.                                 | 14           | Miller 2<br>Red Wing 4               | 5% x63%<br>234 x4                                      | 1,000        | 800<br>300              | L M.<br>L M.                                    |
|                | 61/2 to 10 H                   | Inre    | hoguer                    | Four-C        | vele Mo          | tore                                  | 14           | Regal 2                              | 514×612  | 550          | 985                     | L Opt.  |
|                | 0/2 10 10 1                    | . 0, 30 | Potter                    | 2 0111 -0     | Locat            |                                       | 14           | Wolverine 2<br>Buffalo 2             |  | 425<br>350   | 1,279<br>1,400          | L М.<br>L Dы.                                   |
| Rate           | d                              |         | f Bore &                  |               | 0                | ſ                                     | 14           | Caille 4                             | 336x4  | 950          | 664                     | T J. S.   |
| H. P.          | Motor ·<br>Palmer              | Cyls    | 5%x6                      | R.P.M.<br>600 | Wt. Valv         | es Ignition                           | 15           | Carson 4<br>Doman 2                  | 256x4<br>454x6   | 1,000<br>800 | 300<br>800              | L Opt.<br>T M.<br>H J. S.                       |
| 7              | Chesapeake                     | 1       | 5 x6                      | 600           | 500 L            | M.                                    | 15           | Evansville 4                         | 434x6<br>434x5   | 500<br>500   | 625<br>900              | H J. S.   |
| 7              | Doman<br>Frisbie Valve-in-he   | ad 1    | 434x6<br>6 x6             | 600<br>500    | 500 T<br>500 H   |                                       | 15<br>15     | Harris<br>Pacific Heavy-Duty         |  | 400          | 1,500                   | H J. S.<br>T A. K.                              |
| 7              | Guarantee<br>Pacific Heavy-Dut | 1       | 6 x5                      | 400           | 890 E            | 1 8                                   | 15           | Palmer<br>Seattle Standard           | 435×6  | 600          | 900<br>700              | H J. S.<br>T A. K.<br>T I. S.                   |
| 7              | Palmer                         | 2       | 6 x7<br>436x436           | 600           | 500 7            | M.<br>A. K.                           | 15           | Sterling 2                           | 534×7  | 500          | 1,150                   | I. M.   |
| 7              | Regal<br>Seattle Standard      | 1       | 534x632<br>5 x6           | 550<br>600    | 760 L<br>575 T   | Opt.                                  | 15<br>15     | Vulcan<br>Wright Reliable            | 61/4×71/4<br>73/4×9                                    | 475<br>350   | 1,350<br>1,780          | T J. S.<br>H M. I. S.                           |
| 736            | Evansville                     | 2       | 436x5                     | 500           | 390 I            | I. S.                                 | 10           |                                      |  |              |                         |   |
| 736            | Vulcan<br>Acme                 | 1       | 634x734                   | 450<br>360    | 850 T<br>1,470 H | J. S.<br>I Opt.                       | -            | 16 to 20 Hors                        | epower 1   | our-C        |                         |   |
| 8              | Anderson                       | 9       | 434x5                     | 550           | 550 7            | I. S.                                 |              |                                      | of Bone &  |              |                         | ation<br>of                                     |
| 8              | Atlas Imperial<br>Carl         | 1       | 634x8                     | 400<br>350    | 1,075 H          | M. & B.                               | Rate<br>H. P |                                      | of Bore &<br>s. Stroke                                 | R.P.M        | . Wt. Va                | ives ignition                                   |
| 8              | Carl                           | 2       | 436x5<br>434x5            | 600           | 450 I            | A. K.                                 | 16           | Acme                                 | 2 634×734  | 360<br>380   | 2,250<br>2,475          | H O.<br>H M. & B.                               |
| 8              | Dunn<br>Enterprise             | 1       | 6%x8                      | 700<br>400    | 300 I<br>1,750 I | J. S.<br>M. & B.                      | 16           | Cady of Canastota                    | 334x4  | 800          | 385                     | Y Mr  |
| 8              | Evansville                     | 1       | 6 x634                    | 500           | 650              | 1 J. S.                               | 16           | Carl<br>Dunn                         | 636x8<br>436x5   | 400<br>700   | 890<br>475              | L A. K.   |
| 8              | Frisco Standard<br>Guarantee   | 2       | 4%x6<br>6 x7              | 440<br>500    | 1,443 T          | . I. S.                               | 16           |                                      | 2 6%x8   | 400          | 2,880                   | L J. S.<br>H M. & B.                            |
| 8              | Hicks<br>Honest Clay           | 1       | 634x734<br>634x7<br>434x5 | 425<br>375    | 1,100 H          | 4 M. & B.                             | 16           | Evansville<br>Frisbie Valve-in-head  | 2 6 x634<br>2 6 x6                                     | 500<br>550   | 925<br>700              | H J. S.<br>H J. S.                              |
| 8              | Honest Clay                    | 2       | 434×5                     | 500           | 575              | I J. S.                               | 16           | Frisco Standard                      | 2 634×734  | 360          | 2,418                   | T Opt.  |
| 8              | Knox<br>Liberty Kid            | 1       | 534x634                   | 600           | 880 I<br>260 I   | J. S.<br>I Opt.                       | 16           |                                      | 2 6 x7<br>2 614x734<br>2 614x7<br>2 614x7<br>2 514x634 | 450<br>425   | 1,000<br>2,500          | L J. S.<br>H M. & B.                            |
| 8              | Nieland                        | 2       | 636x8                     | 325           | 900 1            | Opt.<br>M. & B.                       | 16           | Honest Clay                          | 2 634x7<br>2 534x634                                   | 400          | 2,025                   | H J. S.<br>H J. S.<br>T J. S.                   |
| 8              | Nieland<br>Olympic             | 2 2     | 5 x6<br>334x434           | 400<br>700    | 800 I            | . M. & B.                             | 16           | Knox<br>Lathrop                      | 2 534x634<br>2 534x634                                 | 600<br>450   | 1,250                   | T 1. S.   |
| 8              | Philadelphia                   | 1       | 6 x8                      | 350           | 1,000 1          | M. & B.                               | 16           | Mianus                               | 2 6 x8   | 400          | 1,600                   | T Opt.  |
| 8              | Regal<br>Roberts               | 2       | 4 x434                    | 1,000         | 520 I<br>185 I   | S.                                    | 16           | Minland                              | 9 612-8  | 800<br>325   | 1,400                   | L M. &IB.                                       |
| 8              | Seattle Standard               | 2 2     | 3%x4<br>3%x4              | 950           | 205              | S.   S.   S.   S.   S.   S.   S.   S. | 16           | Philadelphia                         | 2 634x8<br>opp. 6 x6<br>4 454x6                        | 375          | 2,000                   | L M. & B.<br>L M. & B.<br>H M.<br>T J. S.       |
| 8              | Vulcan<br>Automatic            | 2 3     | 456×6<br>434×5            | 550<br>500    | 700<br>760       | J. S.<br>I. S.<br>Dopt.               | 16<br>16     | Reliable Heer 2                      | opp. 5 x6  | 550<br>550   | 1,150<br>1,000          | T J. S.   |
| 9              | Hettinger                      | 2       | 439x6                     | 550           | 640              | A. K.                                 | 16           | Wood & Chute                         | 2 0 X/   | 400          | 1,300<br>450            | T J. S.<br>L J. S.<br>L M.<br>J. S.             |
| 9              | Le Roi<br>Regal                | 4       | 2%x4<br>636x7             | 1,000<br>500  | 330<br>1,230     | L Opt.<br>L Opt.                      | 17           | Fay & Bowen<br>Acadia                | 4 334 x43<br>2 5 x63                                   | 850          | 800                     | J. S.   |
| 10             | Acadia                         | 1       | 634x8                     | 450           |                  | . Opt.                                | 18           | Automatic                            | 3 51/4×7   | 400<br>750   | 1,425                   | L Opt.<br>L A. K.<br>H J. S.                    |
| 10             | Acme<br>Atlas Imperial         | 1 2     | 734×9                     | 340           | 1,350            | H M. & B.                             | 18           | Fisherman                            | 4 436x5<br>3 5 x6                                      | 550          | 1,300                   | H J. S.   |
| 10             | Enterprise                     | 1       | 736x83                    | 6 375         | 2,140            | H M. & B.                             | 18           | Frisbie Valve-in-head                | 3 5 x6<br>3 454x5<br>2 534x8                           | 650          | 650<br>1,450            | L Opt.<br>L A. K.<br>H J. S.<br>H J. S.<br>T M. |
| 10             | Evansville                     | 2       | 5 x6                      | 500           | 550              | H J. S.                               | 11 18        | Gaeth                                | 2 07310  | 000          | 2,100                   |   |

### Four-Cycle Marine Motors for 1921—(Continued)

| 16 to 20 Ho | rsebower | Four-C | vcle | Motors |
|-------------|----------|--------|------|--------|
|-------------|----------|--------|------|--------|

|       |                    |            | _            |        | 1     | Location         |                   |
|-------|--------------------|------------|--------------|--------|-------|------------------|-------------------|
| Rated |                    |            | Bore &       |        |       | of               |                   |
| H. P. |                    | Cyls.      | Stroke       | R.P.M. | Wt.   | Valves           | Ignition          |
| 18    | Harris             | 2          | 5%x63%       | 500    | 1,750 | H                | M                 |
| 18    | Hettinger          | 2          | 6½x8         | 425    | 1,600 | 1.               | A. K.             |
| 18    | Kermath            | 4          | 334 x4       | 1,200  | 500   | L                | M.                |
| 18    | Murray & Tregurth  | a 2        | 612x8        | 425    | 1,867 | L                | Opt.              |
| 18    | Nieland            | 3          | 6 x7         | 375    | 1,600 | T                | M. & B.           |
| 18    | Palmer             | 2          | 634x8        | 400    | 1,600 | T<br>L<br>L<br>L | A. K.             |
| 18    | Palmer             | 3          | 5 x6         | 600    | 1,000 | T                | A. K.             |
| 18    | Regal              | 2          | 635x735      | 500    | 1,625 | L                | Opt.              |
| 18    | Scripps            | 2          | 434x6        | 900    | 700   | L                | M.                |
| 18    | Standard           | 2          | 6 x8         | 400    | 1,200 | L                | M. & B.           |
| 18    | Wisconsin          | 4          | 314x5        | 1,000  | 490   | L                | M.                |
| 20    | Acadia             | 3222422244 | 61/2×8       | 450    | 1,760 |                  | Opt.              |
| 20    | Acme               | 2          | 734 x9       | 340    | 2,925 | H                | Opt.              |
| 20    | Atlas Imperial     | 2          |              | 350    | 3,280 | H                | M. & B.           |
| 20    | Brennan            | 4          | 4 x5         | 1,000  | 600   | L                | B. & M.           |
| 20    | Buffalo            | 4          | 3%x5         | 800    | 710   | I.               | Dbl.              |
| 20    | du Pont            | 2          | 5 x616       | 750    | 1,250 | H                | M.                |
| 20    | Enterprise         | 2          | 734x934      | 360    | 4,500 | H                | M. & B.           |
| 20    | Erd                | 4          | 4 x6         | 1,000  |       | H                | M.                |
| 20    | Evansville         | 4          | 5 x6         | 500    | 925   | H                | M.                |
| 20    | Foreman            | 2          | 51/2×7       | 500    | 1,250 | H                | B. & M.           |
| 20    | Frisco Standard    | 2          | 734x9        | 320    | 3,520 | T                | Opt.              |
| 20    | Guarantee          | 2          | 7 ×7         | 450    | 1,200 | Ĺ                | J. S.             |
| 20    | Hicks              | 2 2 2 2 2  | 71/2×81/2    | 400    | 3,000 | H                | M. & B.           |
| 20    | Honest Clay        | 2          | 734x7        | 400    | 2,150 | H                | I. S.             |
| 20    | Hunter             | 4          | 334×434      | 800    | 550   | I.               | J. S.<br>M.       |
| 20    | Knox Valve-in-head | 4 4        | 31/2×5       | 800    |       | H                | M. I. S.          |
| 20    | Miller             | 4          | 3½x5         | 900    | 650   | Î.               | M.                |
| 20    | Nieland            | 2          | 712x9        | 300    | 2,000 | ī                | M. & B.           |
| 20    | Palmer             | 2          | 436x6        | 600    | 1,150 | Ť                | A. K.             |
| 20    | Peerless           | ā          | 4 x6         | 600    | 750   | Ĺ                | M.                |
| 20    | Red Wing           | 4          | 336x436      | 700    | 670   | L                | M.                |
| 20    | Regal              | 4          | 43/x51/2     | 600    | 985   | Ĺ                | J. S.             |
| 20    | Reliable Heer      | 2 opp.     | 6 x6         | 600    | 850   | H                | M.                |
| 20    | Seattle Standard   | 2          | 6 x7         | 525    | 1,250 | T                | J. S.             |
| 20    | Twentieth Century  |            | 634x834      | 400    | 2,000 | T                | M.                |
| 20    | Union Century      | 2          | 716.0        | 360    | 2,900 | ĩ                | M. & B.           |
| 20    | Vulcan             | 4          | 7½x9<br>5¼x7 | 500    | 1,300 | Ť                | J. S.<br>M. I. S. |
| 20    | Weight Polithle    | 2          | 6 7714       | 450    | 1,810 | Ĥ                | MIS               |

21 to 30 Horsepower Four-Cycle Motors

|          |                        |        |                               |            | L              | ocation      |                                  |
|----------|------------------------|--------|-------------------------------|------------|----------------|--------------|----------------------------------|
| Rated    | M                      | vo. of | Bore &                        | R.P.M.     | 8874           | of<br>Valves | Ignition                         |
| н. Р.    |                        | Cyls.  | Stroke                        | 500        | Wt.            | T            | J. S.                            |
| 21       | Lathrop<br>Buffalo     | 2      | 5 1 x 6 1/2<br>7 x 9          | 350        | 2,100          | Ĺ            | Dbi.                             |
| 22<br>22 | Miller                 | 4      | 41/2×6                        | 800        | 1,200          | ï            | M.                               |
| 22       | Vulcan                 | 2      | 71/2×81/2                     | 425        | 2,100          | Ť            | LS                               |
| 22       | Wisconsin              | 4      | 3%x5                          | 1,000      | 523            |              | J. S.<br>M.                      |
| 22       | Wolverine              | 3      | 616x7                         | 425        | 1,980          | i.           | M.                               |
| 24       | Anderson               | 4      | 5 x6                          | 500        | 1,600          | L            | M.                               |
| 24       |                        | 4      | 53/2×7                        | 400        | 1,800          | Ĺ            | Opt.                             |
| 24       | Automatic<br>Buffalo   | 4      | 5 x634                        | 400        | 1,960          | ĩ.           | Dbl.                             |
| 24       | Carl                   | 4      | 5 x6                          | 650        | 1,250          | L            | I S                              |
| 24       | Dunn                   | 6      | 41/4×5                        | 800        | 625            | Ĺ            | J. S.<br>J. S.<br>J. S.<br>J. S. |
| 24       | Evansville             | 3      | 6 x61/4                       | 500        | 1,300          | H            | 1 8                              |
|          | Fisherman              | 4      | 5 x6                          | 550        | 1,500          | H            | 1 8                              |
| 24<br>24 |                        | 3      | 6 x8                          | 400        | 2,200          | T            | Opt.                             |
|          | Mianus<br>Nieland      | 3      | 61/2×71/2                     | 325        | 2,000          | Ť            | M. & B.                          |
| 24       |                        | 4      | 5 x6                          | 600        | 1,250          | Ť            | A. K.                            |
| 24       | Palmer                 | 2      | 5%x7                          | 600        | 1,200          | Ť            | M.                               |
| 24       | Peerless<br>B - d Wine | 4.     | 3%x4%                         | 700        | 680            | Ĺ            | M.                               |
| 24       | Red Wing               | 4      | 5 x632                        | 450        | 1,600          | Ĺ            | M. & B.                          |
| 24       | Standard               | 4      | 4 x5                          | 1,000      | 556            | Ĭ.           | M.                               |
| 24       | Wisconsin              | 3      |                               | 400        | 1,700          | I.           | I. S.                            |
| 24       | Wood & Chute           | 2      | 6 x7                          |            | 2,700          | H            |                                  |
| 25       | Acme                   |        | 614×716                       | 600<br>375 | 2,250<br>2,550 | H            | Opt.                             |
| 25       | Acme                   | 3      | 614x736                       |            | 2,550          |              | Opt.                             |
| 25       | Automatic              | 2      | 734×9                         | 350        | 2,625          | L<br>T       | Opt.                             |
| 25       | Doman                  | 2      | 6 x7                          | 800        | 1,500          |              |                                  |
| 25       | Frisco Standard        | . 3    | 61/4×7                        | 450        | 2,812          | T            | Opt.                             |
| 25       | Frisbie Valve-in-hea   |        | 6 x6                          | 600        | 1,050          | H            | J. S.                            |
| 25       | Guarantee              | 4      | 51/2×51/2                     | 600        | 1,500          | H            | J. S.<br>M.                      |
| 25       | Gray                   | 4      | 315x5<br>715x9<br>515x7       | 800        | 600            |              | M.                               |
| 25       | Hettinger              | 2      | 712x9                         | 375        | 2,500          | L            | A. K.                            |
| 25       | Honest Clay            | 4      | 5/2×7                         | 450        | 3,100          | H            | M. I. S.                         |
| 25       | Kermath                | 4      | 4 ×4                          | 1,200      | 535            | ŗ            | M.                               |
| 25       | Knox                   | 2      | 7 x8                          | 550        | 1,900          | L            | J. S.                            |
| 25       | Palmer                 | 2      | 73%x10                        | 400        | 3,000          | T            | A. K.                            |
| 25       | Reliable Heer          | 2 opp. | 7 ×7                          | 450        | 1,800          | H            | М.                               |
| 25       | Sterling               | 4      | 3% x516                       | 1,000      | 600            | L            | · M.                             |
| 25       | Superior               | 4      | 43/2×6                        | 750        | . 555          | L            | J. S.                            |
| 25       | Vulcan                 | 3      | 639×734                       | 475        | 1,800          | T            | J. S.                            |
| 26       | Palmer                 | 3      | 636x8                         | 400        | 2,000          | T            | A. K.                            |
| 26       | Waukesha               | 4      | 3%x5%                         | 1,000      | 615            | L            | M.                               |
| 27       | Acme                   | 2      | 814x10                        | 320        | 3,975          | H            | Opt.                             |
| 27       | Gaeth                  | 3      | 514x8                         | 600        | 1,800          | T            | M.                               |
| 27       | Standard               | 3      | 6 x8                          | 400        | 1,800          | L            | M. & B.                          |
| 28       | Lathrop                | 4      | 5 4x63/2<br>61/2x8            | 500        |                | T            | Opt.                             |
| 28       | Murray & Tregurth      | 1a 3   | 612x8                         | 450        | 2,216          | L            | Opt.                             |
| 28       | Speedway               | 4      | 4 ×459                        | 1,200      | 560            | L            | M                                |
| 28       | Trego Model 17         | 2      | 5 x8                          | 800        | 1,500          | H            | B. & M.                          |
| 30       | Acadia                 | 3      | 634x8                         | 450        | 2,200          | 2.2          | Opt.                             |
| 30       | Atlas Imperial         | 2      |                               | 320        |                | H            | M. & B.                          |
| 30       | Automatic              | 4      | 5 x7                          | 550        | 1,800          | L            | J. S.<br>M.                      |
| 30       | Bridgeport             | 3      | 634x734                       | 450        | 1,800          | L            | M.                               |
| 30       | Buffalo                | 4      | 6 x736                        | 350        | 2,525          | L            | Dbl.                             |
| 30       | Buffalo                | 4      | 434×5                         | 800        | 929            | L            | Dbl.                             |
| 30       | Doak                   | 2      | 8 x10                         | 350        | 4,900          | H            | M.                               |
| 30       | Enterprise             | 2      | 9 x11                         | 320        | 4,750          | H            | M. & B.                          |
| 30       | Enterprise             | 3      | 6%x814                        | 400        | 5,000          | H            | M. & B.                          |
| 30       | Erd                    | 4      | 434x6                         | 1,000      |                | H            | M.                               |
| 30       | Frisbie Valve-in-he    |        | 434×5                         | 800        | 725            | H            | I. S.                            |
| 30       | Frisco Standard        | 3      | 614x8                         | 360        | 4,125          | T            | Opt.                             |
| 30       | Harris                 | 4      | KBZ - 612                     | 500        | 2,000          | H            | М.                               |
| 30       | Hicks                  | 3      | 736x8                         | 450        | 3,150          | H            | M & B                            |
| 30       | Lathrop                | 3      | 516×614                       | 700        | 0,100          | T            | I. S.                            |
| 30       | Lewis Ultra Six        | 6      | 316x5                         | 1,000      | 680            | LH           | 1. S.                            |
| 30       | Miller                 | 4      | 7½x8<br>5½x6½<br>3½x5<br>5¼x6 | 700        | 1.500          | L            | I. S.<br>I. S.<br>M.             |
| 30       |                        | 4      | 514x614                       | 600        | 1,550          | Ĩ.           | I. S.                            |
| 30       | Regal<br>Vulcan        | 4      | 634x734                       | 475        | 2,100          | Ť            | j. s.<br>j. s.<br>M.             |
|          |                        |        | U234174                       | 210        | 40,000         | -            | 2                                |
| 30       | Wisconsin              | 4      | 434x5                         | 1,000      | 612            | T            | M. I. S.                         |

31 to 40 Horsepower Four-Cycle Motors

| _              |                       |                 |                             |              | I            | ocation      |               |
|----------------|-----------------------|-----------------|-----------------------------|--------------|--------------|--------------|---------------|
| Rated<br>H. P. |                       | No. of<br>Cyls. | Bore &<br>Stroke            | R.P.M.       | Wt.          | of<br>Valves | Ignition      |
| 31             | Waukesha              | 4               | 4 x534                      | 1,000        | 825          | L            | M.            |
| 32             | Evansville            | 4               | 6 x634                      | 500          | 1,425        | H            | J. S.         |
| 32             | Mianus                | 4               | 6 x8                        | 400          | 2,750        | T            | Opt.          |
| 32             | Regal                 | 4               | 416x516                     | 1,000        | 800          | L            | J. S.         |
| 32             |                       | 2 opp.          | 714x8                       | 450          | 2,000        | H            | J. S.<br>M.   |
| 32             | Wolverine             | 3               | 736×9                       | 375          | 3,490        | L            | M.            |
| 32             | Wood & Chute          | 4               | 6 x7                        | 400          | 2,300        | L            | J. S.         |
| 35             | Acme                  | 3               | 734×9                       | 350          | 4,075        | H            | Opt.          |
| 35             | Atlas Imperial        | 3               |                             | 350          | 4,100        | H            | M. & B.       |
| 35             | Brennan               | 4               | 436×5                       | 800          | 750          | L            | B. & M.       |
| 35             | Enterprise            | 3               | 732x932                     | 360          | 5,500        | H            | M. & B.       |
| 35             | Grav                  | 4               | 4 x6                        | 800          | 800          | H            | M             |
| 35             | Hicks                 | 3               | 734x9                       | 450          | 4,300        | H            | M. & B.       |
| 35             | Honest Clay           | 4               | 63/4×7                      | 450          | 3,300        | H            | M. I. S.      |
| 35             | Miller                | 4               | 534x736                     | 550          | 1,900        | L            | M.            |
| 35             | Niagara               | 4               | 434 x535                    | 1,000        | 995          | T            | J. S.         |
| 35             | Palmer                | 4               | 638x8                       | 400          | 2,400        | T            | A. K.         |
| 35             | Palmer                | 3               | 73%x10                      | 400          | 3,500        | T            | A. K.         |
| 35             | Peerless              | 4               | 5 x6                        | 600          | 850          | r            | М.            |
| 35             | Scripps               | 4               | 434x6                       | 900          | 1,050        | L            | M.            |
| 35             | Treiber               | 4               | 414 16                      | 1,000        | 850          | L            | M.            |
| 35             | Union                 | 3               | 734x9                       | 360          | 4,825        | T            | M. & B.       |
| 35             | Vulcan                | 3               | 734x834                     | 425          | 2,850        | T            | J. S.         |
| 36             | Carl                  | 4               | 636x8                       | 400          | 2,990        | L            | A. K.         |
| 36             | Gaeth                 | 4               | 514x8                       | 600          | 2,000        | T            | M.            |
| 36             | Gray-Prior            | 4               | 412x8                       | 700          | 1,000        | ŗ            | J. S.         |
| 36             | Hettinger             | 4               | 634x8                       | 425          | 3,100        | r            | A. K.<br>M.   |
| 36             | Red Wing              | 4               | 4 16 x5                     | 1,000<br>500 | 610          | L.           | J. S.         |
| 36             | Regal                 | 4               | 634x734                     | 1,000        | 2,700<br>840 | ī            | M.            |
| 36             | Waukesha              | 3               | 436×536<br>736×9            | 350          | 3,465        | Ĺ            | Opt.          |
| 37             | Automatic<br>Standard | 4               | 6 x8                        | 400          | 2,800        | Ĩ.           | M. & B.       |
| 40             | Acadia                | 4               | 614x8                       | 450          | 2,600        |              | Opt.          |
| 40             | Acadia                | 4               | 5 x634                      | 1,050        | 1,200        |              | J. S.         |
| 40             | Acme                  | 3               | 614x734                     | 600          | 2,550        | H            | Opt.          |
| 40             | Acme                  | 4               | 634×734                     | 450          | 3,475        | H            | Opt.          |
| 40             | Automatic             | 4               | 516x7                       | 550          | 1,850        | L            | J. S.         |
| 40             | Brennan               | 4               | 43/2×5                      | 1,200        | 700          | L            | B. & M.       |
| 40             | Brennan               | 4               | 5 x5                        | 1,000        | 850          | L            | B. & M.       |
| 40             | Brennan               | 6               | 436×5                       | 750          | 950          | L            | B. & M.       |
| 40             | Doak                  | 3               | 734×9                       | 375          | 5,600        | H            | M.            |
| 40             | Doman                 | 4               | 434×6                       | 900          | 1,200        | T            | M.            |
| 40             | du Pont               | 4               | 434 x 6<br>534 x 6          | 750          | 1,850        | H            | M.            |
| 40             | Erd                   | 4               | 456×6                       | 1,000        |              | H            | M.            |
| 40             | Fay & Bowen           | 4               | 4 14 x5 1/2<br>4 1/4 x5 1/2 | 1,400        | 700          | L            | M.            |
| 40             | Fay & Bowen           | 4               | 4%x51/2                     | 1,000        | 950          | L            | M             |
| 40             | Foreman               | 4               | 51/2×7                      | 500          | 1,250        | H            | B. & M.       |
| 40             | Frisbie Valve-in-he   |                 | 6 x6                        | 600          | 1,200        | H            | J. S.         |
| 40             | Frisco Standard       | 3               | 8 x10                       | 320          | 5,780        | T            | Opt.          |
| 40             | Imperial              | 4               | 61/2×8                      | 450          | 2,600        | L            | I.S.          |
| 40             | J. V. B.<br>Kermath   | 4               | 4%×6                        | 800          | 1,450        | H            | M. I. S.      |
| 40             | Kermath               | . 4             | 436x634                     | 1,200        | 1,350        | L            | M.            |
| 40             | Knox (Valve-in-he:    | ad) 4           | 5 x512                      | 300          | 950          | H            | B. & M.       |
| 40             | Lathrop               | . 4             | 534×634                     | 700          |              | T            | J. S.<br>Opt. |
| 40             | Murray & Tregurt      | ha 4            | 632x8                       | 450          | 2,916        | L            | Opt.          |
| 40             | Red Wing              | 4               | 412×5<br>514×7              | 1,000        | 650          |              | M.4.          |
| 40             | Vulcan                | 6               | 5%x7                        | 550          | 1,900        | T            | J. S.         |
| 40             | Waukesha              | 4               | 416x614                     | 1,000        | 910          | L            | M.            |
| 40             | Wisconsin             | 4               | 4%x51/2                     | 1,000        | 787          | T            | M.            |
| 40             | Wolverine             | 4               | 51/2×7                      | 800          | 1,500        |              | M. I. S.      |
| 40             | Wright Reliable       | 4               | 6 x73%                      | 450          | 3,142        | 8.3          | m. 1. 0.      |

42 to 50 Horsepower Four-Cycle Motors

| Rated |                     | No of  | Bore &          |        | 1     | ocation of |             |
|-------|---------------------|--------|-----------------|--------|-------|------------|-------------|
| H. P. |                     | Cyls.  | Stroke          | R.P.M. | Wt.   | Valves     | Ignition    |
| 42    | Wisconsin           | 6      | 434×5           | 1.000  | 826   | T          | M.          |
| 42    | Wolverine           | 3      | 834x9           | 375    | 3,660 | I.         | M.          |
| 14    | Speedway            | 4      | 41/2×51/2       | 1,200  | 950   | Ĭ.         | M.          |
| 45    | Acme                | 3      | 834×10          | 325    | 5,050 | H          | Opt.        |
| 45    | Atlas Imperial      | 2      | OZZAIU          | 335    | 0,000 | H          | M. & B      |
| 45    | Automatic           | 3      | 5 x7            | 550    | 2,500 | i.         | J. S.       |
| 45    | Bridgeport          | 9      | 734×9           | 375    | 3,200 | ĩ.         | M.          |
| 45    | Buffalo             | 3 4    | 7 x9            | 350    | 3,655 | î.         | Dbl.        |
| 45    | Doak                | 3      | 8 x10           | 350    | 5,500 | H          | M.          |
|       |                     | 3      | 834×1034        | 340    | 6,750 | H          | M. & B      |
| 45    | Enterprise          |        |                 | 1,000  |       | Ĥ          | M.          |
| 45    | Erd                 |        | 434×6<br>5 ×634 | 1,000  | 1,095 | T          | M.          |
| 45    | Fay & Bowen         |        |                 | 800    | 1,100 | Ĥ          | M.          |
| 45    | Gray                | 9      | 4%x6            | 350    | 4,000 | H          | M.          |
| 45    | Reliable            | 2 opp. | 914x10          | 900    | 1,300 | i.         | M.          |
| 45    | Scripps             | 6      | 434×6           |        |       | Ť          | M. & B      |
| 45    | Union               | 3      | 834×1034        | 330    | 6,450 | Ť          |             |
| 45    | Vulcan              | 4      | 734x834         | 425    | 3,400 | H          | J. S.       |
| 45    | Wright Reliable     | 3      | 732x9           | 350    | 4,068 |            | M. I. S     |
| 46    | Wisconsin           | 4      | 5.1x53/2        | 1,000  | 795   | T          | M.          |
| 50    | Acme                | 4      | 714x9           | 375    | 5,160 | H          | Opt.        |
| 50    | Atlas Imperial      | 4      |                 | 380    | 5,800 | H          | M. & B      |
| 50    | Anderson            | 4      | 7 x83/2         | 450    | 2,900 | T          | M.          |
| 50    | Automatic           | - 4    | 734x9           | 350    | 4,430 | L          | Opt.        |
| 50    | Automatic           | 4      | 634x8           | 500    | 3,000 | L          | J. S.       |
| 50    | Brennan             | 6      | 41/2×5          | 1,200  | 850   | L          | B. & M      |
| 50    | Doman               | 4      | 6 x7            | 800    | 2,000 | T          | M.          |
| 50.   | Fay & Bowen         | 6      | 436x536         | 1,000  | 900   | T          | M.          |
| 50    | Frisbie Valve-in-he | ad 6   | 434×5           | 900    | 985   | H          | J. S.       |
| 50    | Frisco Standard     | . 3    | 8%x101/2        | 300    | 7,650 | H          | Opt.        |
| 50    | Gaeth               | 4      | 534x8           | 800    | 2,000 | T          | M.          |
| 50    | Guarantee           | 4      | 7 x836          | 450    | 3,000 | L          | J. S.       |
| 50    | Harris              | 6      | 556x633         | 500    | 2,260 | H          | М.          |
| 50    | Hettinger           | 4      | 736x9           | 375    | 4,500 | L          | A. K.       |
| 50    | Honest Clay         | 2      | 832x10          | 350    | 4,000 | H          | M. I. S     |
| 50    | Honest Clay         | 4      | 736x7           | 450    | 3,600 | 71         | M. I. S     |
| 50    | Knox                | 4      | 7 x8            | 550    | 3,300 | I.         | J. S.       |
| 50    | Miller              | 4      | 6 x9            | 450    | 2,700 | L          | M           |
| 50    | Palmer              | 4      | 71/4×10         | 400    | 4,200 | T          | A. K.       |
| 50    | Peerless            | 4      | 5%×7            | 600    | 1,700 | T          | M.          |
| 50    | Regal               | 4      | 734×9           | 450    | 4,800 | L          | I. S.<br>M. |
| 50    | Scripps             | 4      | 434×6           | 1,500  | 1,000 | L          | M.          |
| 50    | Twentieth Centur    | v A    | 635x834         | 450    | 3,400 | L          | Dbl.        |
| 50    | Wankesha            | A      | 5 x636          | 1,000  | 980   | T.         | M.          |
| ou    | W WRESHIE           | (Can   | tinued on       |        |       | _          |             |

# Heavy Oil Marine Motors for 1921

The ignition systems used on these heavy oil engines are very different from those common to the gasoline engines. The abbreviations used in the tables have the following meanings: Hot Bulb, the ignition employed on engines generally using so-called low compression pressures and requiring a heated ball or surface of some kind to ignite the charge; Semi-Diesel, this type also uses a heated surface for ignition, but uses different methods of fuel injection; Comp., ignition on these is entirely due to the heat of compression of the air in the cylinders, high pressure being necessary. H, under location of valves, refers to their location in the head

| Trun- | Cycle | Heavy | Oil | Engines |
|-------|-------|-------|-----|---------|
|       |       |       |     |         |

| ated<br>I. P.        | Motor Cyls<br>Missouri 1               | 5 x6                   | R.P.M. 500         | Wt. Port<br>375 3       | Ignition<br>Hot Bulb |
|----------------------|--|------------------------|--------------------|-------------------------|----------------------|
| 7                    | Remington 1                            | 536x6                  | 500                | 300 3                   | Hot Bulb             |
| 73%                  | Mianus 1<br>Skandia 1                  | 5 4x6%<br>614x614      |                    | 900 2<br>325 2          | Comp.<br>Hot Bulb    |
| 0                    | Skandia 1<br>G. G. 1                   | 6%x8                   | 500 1,<br>480 1,   | 325 2<br>760 3          | Comp.                |
| 0                    | Remington 1                            | 634×6                  | DERE               | 82D 3                   | Comp.<br>Hot Bulb    |
| 1                    | Remington 1                            | 7 x8                   | 400 1,             | 500 3                   | PROF BUILD           |
| 4                    | G. G. 1<br>Remington 2                 | 7%x91/2                | 400 2,<br>500 1,   | 000 3<br>050 3          | Comp.<br>Hot Bulb    |
| 5                    | Mianus 2                               | 51/4×6                 | 500 1,             | 600 2                   | Comp.                |
| 5                    | Mietz 1                                |                        |                    |                         | Comp.<br>Hot Bull    |
| 6                    | Skandia 1                              | 814x915                | 400 2,             | 750 2                   | Hot Buli             |
| 7                    | Remington 1<br>Venn Severin 1          | 834x8<br>8 x10         | 400 1,<br>400 1,   | 600 3<br>875 2          | Hot Bull             |
| 2                    | Venn Severin 1<br>Missouri 3           | 5 x6                   | 500 1,             | 875 2<br>650 3          | Hot Bull             |
| 2                    | Remington 2                            | 634x6                  |                    |                         | Hot Bulk             |
| 3                    | Remington 3                            | 51/4×6                 | 500 1              | 600 3                   | Hot Bull             |
| 4                    | Remington 2                            | 7 x8<br>9 x11          | 400 2,             | 100 3                   | Hot Bull             |
| 5                    | Skandia 1<br>Venn Severin 1            | 9 x11<br>9½x11         | 375 3,<br>400 2,   | 100 3<br>750 2<br>150 2 | Hot Bull             |
| 0                    | Fairbanks Morse C.O. 2                 | 834x10                 | 400 6,             | 855 2                   | Hot Bull             |
| 0                    | G. G. 2                                | 814x914                | 450 9,             | 000 3                   | Comp.<br>Hot Bull    |
| 0                    | Mietz 2                                | 91-02/                 | 200 5              | 000 2                   |                      |
| 0                    | Mianus 2<br>Missouri 4                 | 7 18 x 9 3%<br>5 x 6   | 360 5,<br>500 2,   |                         | Comp.<br>Hot Bulk    |
| 2                    | Remington 4                            | 516×6                  | 500 1.             | 750 3                   | Hot Bull             |
| 4                    | Remington 3                            | 634×6<br>934×8         | 500 1.             | 850 3                   | Hot Bull             |
| 5                    | Remington 2                            | 934 x8                 | 400 3,             | 130 3                   | Hot Bull             |
| 6                    | Kählenberg 2<br>Remington 3            | 834x9<br>7 x8          | - 375 6,<br>400 3, | 000 2<br>400 3          | Hot Bull             |
| 7                    | Skandia 2                              | 834×10                 | 375 5,             | 400 3<br>450 2          | Hot Bull             |
| 0                    | Bolinders 2                            |                        | 425 5,             | 225                     | Hot Bull             |
| 0                    | Venn Severin 2                         | 8 x10                  | 400 3,             | 225<br>380 2            | Hot Bull             |
| 5                    | Fairbanks Morse C.O. 3                 | 8½x10                  | 400 6.             | 945 2                   | Hot Bull             |
| 5                    | G. G. 2<br>Mianus 3                    | 9½x11<br>7¼x9%         | 380 11,<br>360 6,  | 000 3<br>400 2          | Comp.                |
| 5                    | Mierz 3                                | ******                 |                    |                         | Hot Bull             |
| 5                    | Venn Severin 1                         | 1214×1234              | 300 3,             | 950 2                   | Hot Bull             |
| 5                    | Venn Severin 2                         | 934x11                 | 400 4,             | 000 2                   | Hot Bull             |
| 5                    | Weiss 3<br>Remington 4                 | 634×6                  | 425 4,<br>500 2.   | 500<br>000 3            | Opt.<br>Hot Bull     |
| 0                    | Bolinders 2                            | 074 x0                 | 375 7,             | 040                     | Hot Bull             |
| 0                    | Laujer 1                               | 131/4×15%              | 300 10,            | 040<br>000 2            | Hot Bull             |
| 4                    | Kahlenberg 3                           | 856x9                  | 375 8,             | 000 2                   | Hot Bull             |
| 5                    | Skandia 2                              | 10%x11%                | 375 7,             | 000 2<br>800 2          | Hot Bull             |
| 0                    | Fairbanks Morse C.O. 4<br>G. G. 2      | 8½x10<br>10½x12½       | 400 %              | 140 2                   | Hot Bull             |
| 10                   | G. G. 4                                | 8141914                | 450 12,            | 000 3<br>500 3<br>500 2 | Comp.                |
| 10                   | Kahlenberg 2                           | 81/2x91/2<br>10 x101/2 | 340 3,             | 500 2                   | Hot Bull             |
| 10                   | Mianus 4                               | 7 dx9%                 | 360 8,             | 000 2                   | Comp.                |
| 10                   | Mietz<br>Weiss 3                       |                        | 385 6.             | 000                     | Hot Bull             |
| 15                   | Bolinders 2                            |                        |                    | 750                     | Opt.<br>Hot Bull     |
| 10                   | Kahlenberg 4                           | 814x9                  | 375 10.            | 000 2                   | Hot Bull             |
| 10                   | Venn Severin 3                         | 935x11                 | 400 4.             | 800 2                   | Hot Bull             |
| 0                    | Skandia 2                              | 11 x14                 | 325 9,             | 250 2                   | Hot Bull             |
| 75<br>75             | Fairbanks Morse C.O. 3<br>Mietz 4      | 103/5×123/5            | 340 14,            | 670 2                   | Hot Bull             |
| 75                   | Remington 4                            | 834×8                  | 400 5,             | 430 3                   | Hot Bull             |
| 75                   | Weiss 3                                |                        | 360 7,             | 500<br>200              | Opt.<br>Hot Bull     |
| 0                    | Bolinders 2                            | 01/-11                 | 300 11,            | 200<br>000 3            | Hot Bull             |
| 10                   | G. G. 4<br>Kahlenberg 3                | 93/2×11<br>10 ×103/2   | 380 16,            | 000 3<br>000 2          | Comp.<br>Hot Bull    |
| 00                   | Kahlenberg 3<br>Fairbanks Morse C.O. 4 | 1036x1236              | 250 17.            | 410 3                   | Hot Bull             |
| 00                   | Lazier 2                               | 1014x1234<br>1314x1534 | 300 19,            | 000 2                   | Hot Bull             |
| 00                   | Venn Severia 2                         | 121/4×131/4            | 300 9,             | 410 2<br>000 2<br>700 2 | Hot Bull             |
| 20<br>20             | Bolinders 2<br>Kahlenberg 4            | 10 x1036               | 400 14             |                         | Hot Bull             |
| 20                   | Skandia 2                              | 14 x15%                | 300 17.            | 500 2                   | Hot Bull             |
| 90                   | Weiss 3                                |                        |                    |                         | Opt.                 |
| 25                   | G. G. 4                                | 1034x1234              | 340 22             | 000 3                   | Hot Bull             |
| 40<br>50             | Skandia 4                              | 11 ×14                 | 325 16,<br>250 32, | 000 2                   | Hot Bul              |
| 50                   | Fairbanks Morse C.O. 3<br>Lazier 3     | 14 x18<br>13½x15¾      | 300 25             | 259 2<br>000 2          | Hot Bull             |
| 50                   | Venn Severin 3                         | 123(x13)4              |                    |                         | Hot Bull             |
| 50<br>60             | Weiss 3                                |                        | 280 15             | 500                     | Opt.                 |
| 60                   | Bolinders 2                            |                        | 225 23             | 000                     | Hot Bul              |
| 80                   | G. G. 4<br>Skandia 2                   | 1156×14<br>1636×19     | 300 38,<br>250 25, | 000 3<br>500 2          | Comp.<br>Hot Bull    |
| 100                  | Fairbanks Morse C.O. 4                 | 14 x18                 | 250 34             | 500 2<br>200 2          | Hot Bull             |
| 100                  | Lazier 6                               | 133/4×15%              | 300 50             | ,000 2                  | Hot Bull             |
| 100                  | Venn Severin                           | 121/(x131/             | 300 18             | 700 2                   | Hot Bull             |
| 25                   | Weiss 4<br>Weiss 3                     |                        | 280 20<br>258 22   | 000                     | Opt.                 |
| 140                  | Bolinders 4                            |                        | 250 33             | 700                     | Opt.<br>Hot Bull     |
| 140                  | G. G. 4                                | 1334×15                | 2200 4.8           | .DGO 3                  | Comp.                |
| 140                  | Skandia 4                              | 14 x15%                | 300 32             | ,000 2                  | Hot Bul              |
| 100                  | Laxier 6<br>Weiss 4                    |                        | 300 50<br>258 30   | 000 2<br>000 2<br>000   | Hot Bul              |
| 100                  | Fairbanks Morse C.O. 6                 | 14 x18                 | 250 38             | 725 2                   | Opt.<br>Hot Bul      |
| 120                  | Bolinders 4                            | ******                 |                    |                         | Hot Bul              |
| 150                  | Skandia 4                              |                        | 250 46             | ,000 2                  | Hot Bul              |
| 180                  | Nordberg 4                             | 15 x20                 | 200 115            | ,000                    |                      |
|                      | Weiss 4<br>Bolinders 4                 |                        | 245 40             | ,000                    | Opt.<br>Hot Bul      |
| 500                  | Skandia 6                              | 1636x19                |                    | 000 2                   | Hot Bul              |
| 500<br>500<br>550    | Nordberg 6                             | 15 x20                 | 200 155            | 000                     |                      |
| 150                  | Busch Sulzer 4                         | 17 ×27                 | 165                |                         | Comp.                |
| 17E                  | Busch Sulzer 6                         | 17 x27                 | 165                |                         | Comp.                |
| ,000<br>,100<br>,650 | Nordberg 4<br>Busch Sulzer 4           | 20%×36                 |                    | ,000                    | Comp.                |
| 650                  | Busch Sulzer                           | 22 x34                 | 135                | *** **                  | Comp.                |
|                      |  | 20%x36                 |                    | ,000                    | cargo                |

| Rated |              | No. of | Bore | 8 a |       |         | 2 or 3 |          |
|-------|--------------|--------|------|-----|-------|---------|--------|----------|
| H. P. | Motor        | Cyls.  | Stro |     | R.P.A | 4. Wt.  | Port   | Ignition |
|       | Busch Sulzer | 4      |      | 44  | 105   |         |        | Comp.    |
| 2,000 | Nordberg     | 4      |      | 48  | 110   | 630,000 | * *    |          |
| 3,000 | Busch Sulzer | 6      |      | 44  | 105   |         |        | Comp.    |
| 3,000 | Nordberg     | 5      | 28 x | 48  | 110   | 950,000 |        |          |

### Four-Cycle Heavy Oil Engines

| Rated          | N                    | 0.06  | Bore &      |       |         | Location<br>of |         |
|----------------|----------------------|-------|-------------|-------|---------|----------------|---------|
| H. P.          |                      | yls.  | Stroke      | R.P.M | . Wt.   | Valves         | Ignitio |
| 1236           | Dodge                | 1     | 634×9       | 425   | 3,800   | H              | Comp.   |
| 25             | Dodge                | 2     | 634 x9      | 425   | 4,800   | H              | Comp.   |
| 25             | Western              | ĩ     | 934x14      | 325   | 4,500   | H              | Comp.   |
| 30             | Quarte               | 4     | 434×63/2    | 600   | 2,150   | H              | Comp.   |
| 371/6          | Quayle<br>Dodge      | 3     | 634 x9      | 425   | 6,200   | H              | Comp.   |
| 50             | Dodge                | 4     | 634 x9      | 425   | 7,400   |                | Comp.   |
| 50             | Fulton               | 3     | 8 x9        | 400   | 10,000  |                | Comp.   |
| 50             | Pittsburgh           | 9     | 83/4×12     | 400   | 12,000  |                | Comp.   |
| 50             | Western              | 9     | 914×14      | 325   | 12,940  |                | Comp.   |
| 60             | Midwest Diesel       | 2 2 4 | 9 x13       | 350   |         |                |         |
| 70             | Fulton               | 4     | 8 x9        | 400   | 14,000  |                | Comp.   |
| 75             | Dodge                | 6     | 6%x9        | 425   | 9,700   |                | Comp.   |
| 75             |                      | 3     | 074 X9      | 400   | 15,500  | H              | Comp.   |
|                | Pittsburgh           | 3     | 813x12      |       |         |                | Comp.   |
| 75             | Western              | 3     | 934×14      | 325   | 16,750  |                | Comp.   |
| 90             | Midwest Diesel       | 3     | 9 x13       | 350   | 90,000  |                | Comp.   |
| 100            | Fulton               | 6     | 8 x9        | 400   | 13,000  | L              | Comp.   |
| 100            | Pittsburgh           | 4     | 814x12      | 400   | 18,000  | H              | Comp.   |
| 100            | Western              | 4     | 934×14      | 325   | 20,000  |                | Comp.   |
| 120            | Midwest Diesel       | 4     | 9 x13       | 350   | 25,000  |                | Comp.   |
| 120            | Nelseco Diesel       | 4     | 9 x121/2    | 350   | 17,400  |                | Comp.   |
| 150            | Pittsburgh           | 6     | 8½x12       | 400   | 24,000  | H              | Comp.   |
| 150            | Western              | 6     | 934×14      | 325   | 27,000  | H              | Comp.   |
| 180            | Midwest Diesel       | 6     | 9 x13       | 350   | 35,000  |                | Comp.   |
| 180            | Nelseco Diesel       | 6     | 9 x1236     | 350   | 22,820  | H              | Comp.   |
| 200            | Winton               | 6     | 11 x14      | 250   |         | 24             | Comp.   |
| 220            | Ingersoll Rand P. R. |       |             |       |         |                |         |
|                | Type                 | 6     | 11 x15      | 300   | 40,000  |                | Comp.   |
| 240            | Nelseco Diesel       | 4     | 13 x18      | 240   | 34,400  |                | Comp.   |
| 240            | Nelseco Diesel       | 8     | 9 x1236     | 350   | 28,375  | H              | Comp.   |
| 300            | Ingersoll Rand P. R. |       |             |       |         |                |         |
|                | Type                 | 6     | 13 x19      | 250   | 63,000  |                | Comp.   |
| 300            | Winton               | 6     | 12 15/16x1  | 8 210 |         | H              | Comp.   |
| 320            | Dow                  | 6     | 12 x18      | 250   | 111     | H              | Comp.   |
| 360            | Nelseco Diesel       | 6     | 13 x18      | 240   | 56,940  | H              | Comp.   |
| 390            | McIntosh & Seymou    | r 6   |             | 265   | ***     | H              | Comp.   |
| 425            | Dow                  | 8     | 12 x18      | 250   |         | H              | Comp.   |
| 480            | Nelseco Diesel       | 8     | 13 x18      | 240   | 76,000  | H              | Comp.   |
| 500            | Dow                  | 6     | 16 x26      | 175   |         |                | Comp.   |
| 500            | Ingersoll Rand P. R. |       |             | 200   |         |                | comp.   |
| 500            | Type                 | 6     | 17 ×27      | 165   | 144,000 |                | Comp.   |
| 550            | Skandia              | 6     | 1634x2934   | 165   | 240,000 |                | Comp.   |
| 640            | McIntosh & Seymou    |       | 10/2490/2   | 190   | 210,000 |                | Comp.   |
| 665            | Dow                  | 6     | 16 x26      | 175   |         | Ĥ              | Comp.   |
| 850            | Skandia              | 6     | 201/2×351/2 | 135   | 320,000 |                | Comp.   |
| 960            | McIntosh & Seymou    |       | auggaddyg   | 135   |         | H              | Comp.   |
|                | Dow                  | 6     | 23 x35      | 135   | 0 0 0   | н              |         |
| 1,060<br>1,150 | McIntosh & Seymou    |       |             | 140   | 9 0 0   | H              | Comp.   |
| 1,150          |                      |       | ******      | 138   | ***     | H              | Comp.   |
|                | McIntosh & Seymou    | 1 0   | 99 .98      | 138   | 0 1 0   | H              | Comp.   |
| 1,415          | Dow                  | - 6   | 23 x35      |       | 9 0 9   |                | Comp.   |
| 1,550          | McIntosh & Seymou    |       |             | 115   | * * *   | H              | Comp.   |
| 2,000          | McIntosh & Seymou    | 1.0   |             | 105   |         | H              | Comp.   |

### Steam Plants

| Rated<br>H. P. | Manufacturer | No. of<br>Cyla. | Bore &<br>Stroke | R.P.M. | Wt.    | Туре   |
|----------------|--------------|-----------------|------------------|--------|--------|--------|
| 25             | Talbot       | 2               | 5 x5             | 800    | 1,250  | Direct |
| 50             | Talbot       | 4               | 5 x5             | 800    | 1,950  | Direct |
| 100            | Talbot       | 4               | 6 x6             | 800    | 2,820  | Direct |
| 100            | Talbot       | 4               | 5 x5             | 800    | 2,500  | Direct |
| 200            | Talbot       | 4               | 8 x8             | 800    | 4,880  | Direct |
| 200            | Talbot       | 4               | 63/4×63/4        | 800    | 4,750  | Direct |
| 400            | Talbot       | 4               | 8 x8             | 800    | 9,300  | Direct |
| 600            | Talbot       | 4               | 91/4×91/4        | 800    | 13,500 | Direct |
| 1,000          | Talbot       | 4               | 11 x11           | 800    | 24,000 | Direct |
| 2,000          | Talbot       | 4               | 15 x15           | 800    | 42,000 | Direct |

### American Manufacturers of Four-Cycle Heavy Oil Motors

(Continued from page 45)

| McIntosh & Seyr                         | nour. McIntosh & Seymour Corp., Auburn, N. Y.         |
|---|---|
|   | 390, 640, 960, 1150, 1300, 1550, 2000 H. P. 6 cyls.   |
| Nelseco                                 | New London Ship & Engine Co., Groton, Conn.           |
|   | 120, 180, 240, 360, 480 H. P. 4, 6, 8 cyls.           |
| Nordberg                                | Nordberg Manufacturing Co., Milwaukee, Wis.           |
|   | 330 to 2800 H. P.                                     |
| Pittsburgh                              | Pittsburgh Filter & Eng. Co., 280 Broadway, New York, |
|   | N. Y. 50, 75, 100, 150 H. P. 2-6 cyls.                |
| Quayle                                  | Commonwealth Motors Co., 326 W. Madison St.,          |
| Quay-                                   | Chicago, Ill. 30 H. P. 4 cyls.                        |
| Western                                 | Western Machinery Co., Los Angeles, Cal.              |
|   | 25, 50, 75, 100, 150 H. P. 1-6 cyls.                  |
| Winton                                  | Winton Engine Works, 2116 W. 106th St., Cleveland, O. |
| *************************************** | 50 75 115 150 225 300 450 H P 3-8 cyle                |



E present on the following pages the Story of the Standard Reverse Gear—what kind of a gear it is, how and where it is built, and a few other things that help to explain the wonderful service and satisfaction which more than 30,000 Standard Gear users are now receiving.

The story is short, told largely in pictures—a little journey through our factory which you will enjoy.

If you are a reverse gear user, a boat owner or prospective buyer we hope you will gain some valuable gear information and suggestions from this story. You'll find it worth reading.



STANDARD GPAR (COMPANY

5928 Commonwealth Ave Detroit Mich



"All the Name Implies"

WHAT is your ideal of a good reverse gear? Is it Cleanliness, Dependability, Quietness, Durability, Compactness, Light Weight, Strength, Simplicity, Easy Adjustment, Smooth Operation?

All of these qualities are found in the Standard Gear. It is not a "one feature" product nor a combination of a few salient talking points, but an honest mechanism built to do its work satisfactorily from every standpoint and to outlast the engine on which it is installed.

Inside of its attractive clean-cut case is an assembly of working parts as simple and well made as a reverse gear can be. Not an ounce of necessary strength is left out; not an ounce of surplus weight is left in.

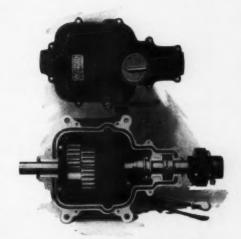
The perfect fitting case is absolutely oil - tight, allowing the gears to be operated in a constant bath of oil. This reduces wear to a negligible factor. The complete enclosure keeps your boat neat and your clothing clean.



"All the Name Implies"

THE mechanisms of most reverse gears look about alike to the uninitiated. But if you are an expert you'll appreciate the superior design of the Standard. Simplicity minimizes the possibility of trouble and facilitates adjustment.

Added to the perfect Standard design are the very finest of materials and the best of machine workmanship—the kind of workmanship for which Detroit products are famous. We haven't been satisfied to build a gear just good enough; our aim is to build the best. And we honestly believe we do.



Note the oil groove and packing which makes the case oil-tight, even at the joints. Oil traps at the end of each bearing return the surplus oil to the case. Notice also the ball thrust bearing at the rear, enclosed within the case and running in an oil bath.



This is the working unit of the Standard Reverse Gear. Looks sturdy—is sturdy. Superlative quality in design, materials and workmanship.



"All the Name Implies"

WHO couldn't build an excellent product in such a factory! Light and roomy, efficiently laid out and completely equipped with the newest, best and most up-to-date machinery money can buy. And manned by skilled machinists accustomed to working to the one-thousandth part of an inch, or less.

Many of the smaller and more accurate machined parts of several of Detroit's most expensive automobiles are produced in our factory.



Where Standard Reverse Gears Are Made



Left. The turret lathe and screw machine department. Here the gear blanks are turned, and the castings machined.

> Below. The gear shapers, cutters and hobbers. Our gears are all cut in our own plant by experts.



Left. Grinding department. The internal expanding ring is ground to size after splitting.

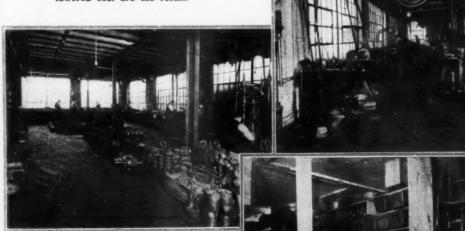


"All the Name Implies"

Right. A corner of our heat treating room, showing two of the largest carbonizing furnaces in Michigan. This is where the steel is treated, carbonized, hardened and drawn in oil, to give it the hard, yet not brittle, wearing surface.

Lower Right. Our aisle of automatic machinery where the smaller parts of the Standard Gear are made. It is such machinery as this that has made America the leading manufacturer for the world. Improved quality, perfect uniformity and lowered cost are the result.





Above. A part of the assembly floor. A large stock of finished units is always in readiness so that each workman is constantly employed on a single operation.

> Right. A section of our stock room. Many Standard users who have had their gears in service from five to ten years are now purchasing their first service parts.



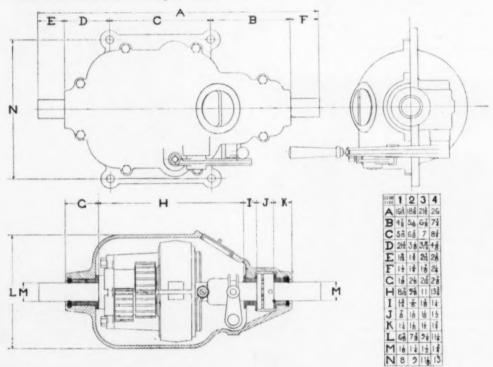
"All the Name Implies"

AND now that you have seen how and where the Standard Reverse Gear is made, don't you think it is good enough for your boat and your engine, no matter how fine they are?

We have told you only one side of the story—the manufacturing side. We haven't told you the service side—of more than 30,000 Standard Reverse Gears now in service, in all sizes and types of boats, on practically all makes of engines and in practically every part of the world. We haven't told of hundreds of letters from pleased users—people don't write reverse gear testimonials unless they are unusually well pleased.

But the only real way to learn the service side of the Standard story is to use a Standard Gear yourself.

Specify a Standard Reverse Gear in your next boat, or on your new engine. Perhaps you need a new gear on the old engine. You'll find the Standard fits in, is easiest to install and cheapest to buy, future service considered. Compare these dimensions with the measurements of your boat.



Engine Manufacturers: Let us quote you on your requirements. A Standard Gear will uphold the Quality and Service of your own product. Write for details.

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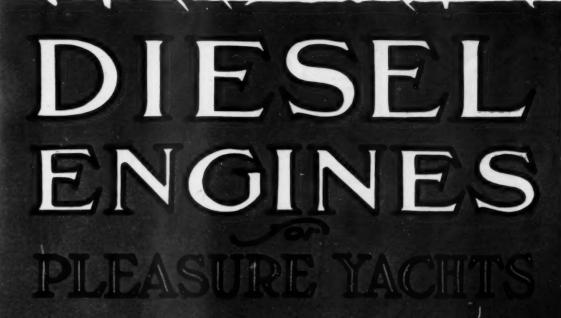
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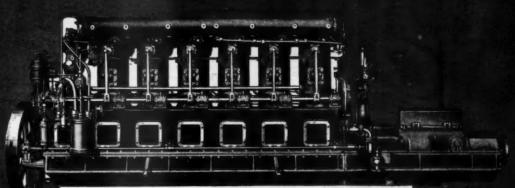
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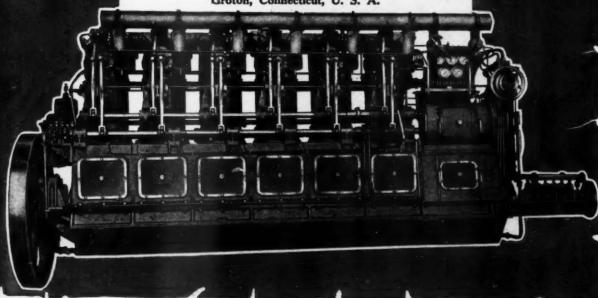


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THE NEW LONDON SHIP & ENGINE COMPANY Groton, Connecticut, U. S. A.







THE NELSECO Diesel is a four cycle engine, very similar in sequence of operations to the typical four cycle gasoline engine. The most noticeable difference is the absence of any electrical ignition apparatus, carburetor or vaporizer in the Diesel engine.

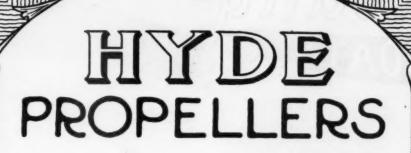
On the suction stroke pure air is drawn into the cylinder through the intake valve (B). On the upward stroke this air is compressed, raising its temperature to a point where it will ignite and completely burn the fuel or crude oil.

At the top of the compression stroke a charge of fuel oil is sprayed under pressure into the heated air, through the fuel valve (E). The oil ignites instantly and the expansion of the burning gases drives the piston down during the power stroke.

The burned gases are forced out through the exhaust valve (G) on the following upward stroke, completing the four-stroke cycle.

The superiority of the NELSECO Diesel lies not only in its economy but also in its reliability, produced by correct design and correct workmanship, and in its durability which is the result of large sturdy parts, slow operating speed and the slow expansion of the heavier fuel oil.

THE NEW LONDON
SHIP AND ENGINE COMPANY
GROTON, CONN.



Efficiency is an inherent quality of Hyde Turbine Type Propellers. This has been amply demonstrated by the records of Hyde-equipped boats.

"Miss America" used stock Hyde propellers when she won the Harmsworth Trophy, the Gold Challenge Cup and the One Mile Championship of North America.

Incidentally 1920 marks the seventh consecutive year that a Hyde-equipped boat has captured the Gold Challenge Cup, which is in itself a remarkable record of propeller efficiency.

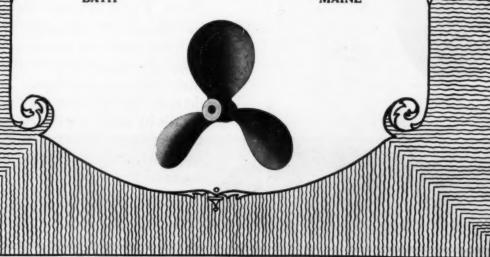
Other 1920 Hyde-equipped winners are

Miss Toronto II
Miss Nassau
N'Everthin
Heldena II
We We
Meteor III
Margaret III

Sure Cure
Gar Jr. II
Leopard V
Gar Jr.
Hoosier V
Shadow V
Altonia

If you desire the utmost from your boat, write for our booklet "Propeller Efficiency". Our Service Department is at your command.

HYDE WINDLASS CO.



# Thomy BOATS



50-ft. Express Cruiser



40-ft. Day Cruiser

UR boating friends will be interested in knowing that we are developing some most unusual and important refinements for 1921 pleasure craft. Higher speeds and more comfortable boats are two special features. It is hoped that these may be announced and possibly exhibited, at the New York Motor Boat show in December. Buyers of express cruisers and fast runabouts will be given the opportunity to discuss these innovations at that time. Those who do not visit the show may secure full details by notifying the ALBANY BOAT CORPORATION, Watervliet, N. Y., that such literature, as prepared, will be acceptable.





35-ft. Mahogany Fast Runabout



· 30-ft. Mahogany Fast Runabout

The appeal of Albany Boats is typified by these photographs. Swift, buoyant, beautiful — yet luxurious, easily handled and safe.

The Albany Fleet comprises 36-, 40-, and 52-ft. Express Cruisers; 26-, 32-, and 35-ft. Fast Runabouts. Construction details for any boat will be given on request. Photographs will also, where possible, be included.

Immediate deliveries are available for the 1921 model Albany 26-foot Runabout. This boat seats seven; 20 m.p.h.; electric starting and lighting.

Immediate deliveries for Florida service can also be arranged on 36-ft. Cruiser, 32-ft. and 30-ft. Fast Runabouts and 33-ft. racer qualified for the Carl Fisher Trophy races.



26-ft. Fast Runabout

### ALBANY BOAT CORPORATION

Seventh Street

Watervliet, New York

32-ft Mahogany Fast Runabout



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"Standard Equipment" on high grade Automotive Power Units because of their in-built quality and the exceptional service which they give.



The extreme durability of Lunkenheimer Automotive Accessories is a contributing factor to safety and reliability in operation.



"Lunkenheimerequipped" is a criterion for "Quality," and is universally acknowledged by builder and user as prime requisite for continuity of operation and economy in maintenance.



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Write for Automotive Accessories Catalog No. 5 CC.



### THE LUNKENHEIMER SO.

argest Manufacturers of High Grade Engineering Specialties in the World

CINCINNATI

Boston



### Four-Cycle Marine Motors for 1921 (Continued from page 47) 54 to 75 Horsepower Four-Cycle Motors

|                |                     |                 |                     | -            | 1      | ocation      | i.            |
|----------------|---------------------|-----------------|---------------------|--------------|--------|--------------|---------------|
| Rated<br>H. P. |                     | vo. or<br>Cyls. | Bore &<br>Stroke    | R.P.M.       | Wt.    | of<br>Valves | Ignition      |
| 54             | Gaeth               | 6               | 51/4x8              | 600          | 3.000  | T            | M.            |
| 54             | Standard            | 6               | 6 88                | 400          | 3,200  | î.           | M. & B.       |
| 54             | Wisconsin           | 4               | 514×7               | 800          | 1,290  | Ť            | M. a. b.      |
| 55             | Acme                | 3               | 8%x101/2            | 300          | 6,680  | Ĥ            | Opt.          |
| 55             | Acme                | 4               | 614x716             | 600          | 3,475  | н            | Opt.          |
| 55             | Atlas Imperial      | 3               | 074 X4 73           | 320          | 6,792  | H            | M. & B.       |
| 55             | Enterprise          | 3               | 9 x101/2            | 320          | 9,200  | H            | M. & B.       |
| 55             |                     | opp.            | 91/4×11             | 350          | 4,300  | H            | M. & B.       |
| 55             | Sterling            | 4               | 53/2×6%             | 800          | 2,050  | T            | D. & M.       |
| 55             | Wisconsin           | 6               | 434 x535            | 1,000        | 1,185  | Ť            | M.            |
| 56             | Vulcan              | 3               | 8%x1034             | 400          | 4,200  | Ť            | I. S.         |
| 57             | Wisconsin           | 4               | 53/4×7              | 800          | 1,290  | Ť            | M.            |
| 60             | Automatic           | 6               | 336x7               | 550          | 2,750  | Ĺ            | J. S.         |
| 60             | Brennan             | 4               | 536x6               | 800          | 1,100  | Ĺ            | B. & M.       |
| 60             | Bridgeport          | 4               | 734x9               | 375          | 4,000  | L            | M.            |
| 60             | Buffalo             | 4               | 536x7               | 900          | 1,730  | Ĩ.           | Dbl.          |
| 60             | Doak                | 4               | 8 x10               | 350          | 6,400  | H            | M.            |
| 60             | du Pont             | 6               | 5 x636              | 750          | 2,250  | H            | M.            |
| 60             | Enterprise          | 3               | 9 x11               | 320          | 10,000 | H            | M. & B.       |
| 60             | Foreman             | 6               | 534x7               | 500          | 2,250  | H            | B. & M.       |
| 60             | J. V. B.            | 4               | 434×6               | 1,200        | 1,350  | H            | M. I. S.      |
| 60             | Murray & Tregurth   |                 | 634x8               | 500          | 3,560  | L            | Opt.          |
| 60             | Murray & Tregurth   |                 | 732×10              | 375          | 4,667  | L.           | Opt.          |
| 60             | Palmer              | 6               | 636x8               | 450          | 3,800  | T            | A. K.         |
| 60             | Standard            | 4               | 634x8               | 600          | 3,200  | L            | Dbl.          |
| 60             | Union               | 3               | 9 x11               | 320          | 7,400  | T            | M. & B.       |
| 60             | Wolverine           | 3               | 91/4x12             | 325          | 6,327  | Ĺ            | M.            |
| 60             | Wright Reliable     | 6               | 6 x736              | 450          | 4,630  | H            | M. I. S.      |
| 60             | Wright Reliable     | 6               | 734x9               | 350          | 5,065  | H            | M. I. S.      |
| 62             | Wisconsin           | 4               | 5%×7                | 800          | 1,290  | T            | M.            |
| 65             | Acme                | 4               | 814x10              | 350          | 6,675  | H            | Opt.          |
| 65             | Acme                | 6               | 634×734             | 500          | 4,825  | Н            | Opt.          |
| 65             | Atlas Imperial      | 4               |                     | 340          |        | H            | M. & B.       |
| 65             | Elco                | 4               | 5 1 x 6             | 1,000        | 650    | T            | M.            |
| 65             | Fay & Bowen         | 6               | 5 x634              | 1,000        | 1,480  | T            | М.            |
| 65             | Frisco Standard     | 4               | 8 x10               | 360          | 8,650  | T            | Opt.          |
| 65             | Wisconsin           | 6               | 5.1x5½              | 1,000        | 650    | T            | M.            |
| 66             | Speedway            | 6               | 41/2×51/2           | 1,200        | 1,200  | L            | M.            |
| 70             | Automatic           | 4               | 7½x9                | 500          | 4,800  | L            | J. S.         |
| 70             | Buffalo             | 6               | 7 x9                | 350          | 4,850  | L            | Dbl.          |
| 70             | Harris              | 4               | 8 x10               | 350          | 5,850  | H            | M.            |
| 70             | Vulcan              | 6               | 71/2×81/2           | 425          | 4,500  | T            | J. S.         |
| 75             | Automatic           | 3               | 10 x14              | 275          | 8,000  | L            | Opt.          |
| 75             | Automatic           | 6               | 736x9               | 350          | 6,500  | r            | Opt.          |
| 75             | Automatic           | 6               | 634x8               | 500          | 4,250  | L            | J. S.         |
| 75             | Doak                | . 3             | 93/2×11             | 300          | 10,000 | H            | M.            |
| 75             | Frishie Valve-in-he |                 | 6 x6                | 750          | 1,600  | H            | J. S.         |
| 75             | Gaeth               | 6               | 51/2×8              | 600          | 3,000  | T            | M.            |
| 75             | Knox                | 6               | 7 x8                | 550          | 4,500  | Ł            | J. S.<br>M.   |
| 75             | Scripps             | 6               | 414×6               | 1,500        | 1,290  | L            | M.            |
| 75             | Speedway            | 4               | 534×7               | 1,000        | 1,850  | i            |               |
| 75             | Standard            | 4               | 8 10                | 400          | 5,300  | Ť            | M. & B.<br>M. |
| 75             | Sturtevant          | 6               | 41/4×6              | 1,600<br>475 | 700    | i.           | Dbl.          |
| 75             | Twentieth Century   | 0               | 614x814<br>834x1014 | 976          | 4,500  | Ť            |               |
| 75             | Vulcan              | 4               | 074 X1U/2           | 375          | 5,500  | 1            | J. S.         |

|       |                    |       |                    |        | 1              | ocation |                    |
|-------|--------------------|-------|--------------------|--------|----------------|---------|--------------------|
| Rated |                    |       | Bore &             | n n 1/ | WELL           | of      | X4-141             |
| н. Р. |                    | Cyls. | Stroke             | R.P.M. |                | Valves  | Ignition           |
| 80    | Acme               | 6     | 734×9              | 425    | 6,950          | H       | Opt.               |
| 80    | Acme               | 6     | 614x71/2           | 600    | 4,825          | H       | Opt.               |
| 80    | Atlas Imperial     | 4     | 0 0                | 320    | 8,000          | H       | M. & B.<br>B. & M. |
| 80    | Brennan            | 4     | 6 x6               | 800    | 1,250          | L       |                    |
| 80    | Buffalo            | 4     | 634×9              | 800    | 2,600          | L       | Dbl.               |
| 80    | Enterprise         | 3     | 10 x1234           | 320    | 12,300         | H       | M. & B.            |
| 80    | Frisco Standard    | 3     | 9%x12              | 280    | 12,600         | T       | Opt.               |
| 80    | Hicks              | 3     | 10 x1234           | 450    | 9,200          | H       | M. & B.            |
| 80    | Niagara            | 4     | 634×7              | 1,000  | 1,650          | T       | J. S.              |
| 80    | Palmer             | 6     | 735×10             | 450    | 5,600          | T       | A. K.              |
| 80    | Union              | 3     | 10 x12             | 310    | 10,700         | T       | M. & B.            |
| 80    | Winton             | 6     | 63/4×9             | 450    |                | L       | M.                 |
| 80    | Wisconsin          | 6     | 514×7              | 800    | 1,545          | T       | M.                 |
| 80    | Wolverine          | 3     | 11 x12             | 325    | 6,747          | L       | M.                 |
| 85    | Acme               | 4     | 8% x103%           | 325    | 8,200          | H       | Opt.               |
| 85    | Frisco Standard    | 4     | 834 x 1035         | 350    | 11,730         | T       | Opt.               |
| 85    | Sterling           | 4     | 51/2×6%            | 1,200  | 1,700          | T       | M.                 |
| 85    | Sterling           | 6     | 536x634            | 800    | 2,450          | T       | D. & M.            |
| 85    | Union              | 4     | 9 x11              | 330    | 10,700         | T       | M. & B.            |
| 85    | Wisconsin          | 6     | 534x7              | 800    | 1,585          | T       | M.                 |
| 90    | Automatic Prod. G. |       | 1035x15            | 250    |                | Ť       | I. S.              |
| 90    | Doak               | 6     | 8 x10              | 350    | 9,500          | H       | J. S.              |
| 90    | Standard           | 6     | 634x8              | 600    | 0,000          | I.      | Dbl.               |
| 90    | Wisconsin          | 6     | 594×7              | 800    | 1,615          | Ť       | M.                 |
| 90    | Wright Reliable    | 6     | 716-0              | 350    | 7,000          | Ĥ       | M. I. S.           |
| 100   | Acme               | 6     | 7½x9<br>8¼x10      | 400    | 8,900          | H       | Opt.               |
| 100   | Automatic          | 4     | 10 x14             | 275    | 11,780         | î.      | Opt.               |
| 100   | Automatic          | 4     | 814x10             | 500    | 6,100          | L       | J. S.              |
| 100   | Buffalo            | 4     | 10 x12             | 300    | 8,200          | ĩ.      | Dы.                |
|       |                    | 4     | 93/4×11            | 300    | 12,000         | H       | M.                 |
| 100   | Doak<br>Elco       | 6     | 5 14x6             | 1,000  | 1,000          | Ť       | M.                 |
| 100   | Harris             | - 6   | 8 x10              | 350    | 7 300          | Ĥ       | M.                 |
| 100   | Honest Clay        | 4     | 81/4×10            | 350    | 7,300<br>7,500 | H       | M. I. S.           |
| 100   | Murray & Tregure   |       | 734×10             | 400    | 6,018          | L       | Opt.               |
| 100   | Standard Creguit   | 6     | 8 x10              | 400    | 8,000          | Ĺ       | Dbl.               |
| 100   |                    | 4     | 514x634            | 1,400  | 1,400          | Ť       | M.                 |
| 100   | Sterling           | 4     | 5%x6               | 1,500  | 1,560          | Ť       | B. & M             |
| 100   | Van Blerck         | 3     | 1914-14            | 325    | 10,117         | î.      | M.                 |
| 110   | Wolverine          | 3     | 1234x14<br>1134x15 | 250    | 16,085         | Ť       |                    |
| 110   | Frisco Standard    |       | 1194 X10           | 280    |                | · T     | Opt.               |
| 110   | Union              | 3     | 12 x15             |        | 17,600         | Ť       | M. & B             |
| 110   | Union              | 4     | 10 x12             | 330    | 12,350         | 17      | M. & B             |
| 115   | Harris             | 4     | 10 x14             | 225    | 12,850         | H       | M.                 |
| 115   | Speedway           | 6     | 6% x836            | 600    | 5,000          | L       | M.                 |
| 115   | Sterling           | 8     | 535x634            | 800    | 2,750          | T       | D. & M             |
| 120   | Automatic Prod. G  | as 4  | 1014x15            | 250    |                | T       | J. S.              |
| 120   | Frisco Standard    | 4     | 9%x12              | 320    | 15,583         | T       | Opt.               |
| 120   | Niagara            | 6     | 634×7              | 1,000  | 2,350          | T       | J. S.              |
| 125   | Acme               | 6     | 8%x1034            | 375    | 10,800         | H       | Opt.               |
| 125   | Hall Scott         | 4     | 5 x7               | 1,700  | 1,100          | H       | Delco              |
| 125   | Sterling           | 6     | 536x634            | 1,200  | 2,250          |         | М.                 |
| 125   | Union              | - 6   | 9 x11              | 320    | 14,400         |         | M. & B             |
| 125   | Winton             | 6     | 8 x9               | 450    |                | L       | М.                 |
| 130   | Speedway           | - 6   | 534×7              | 1,000  | 2,400          |         | B. & M             |
| 145   | Sterling           | 6     | 536×634            | 1,400  | 1,750          |         | M.                 |

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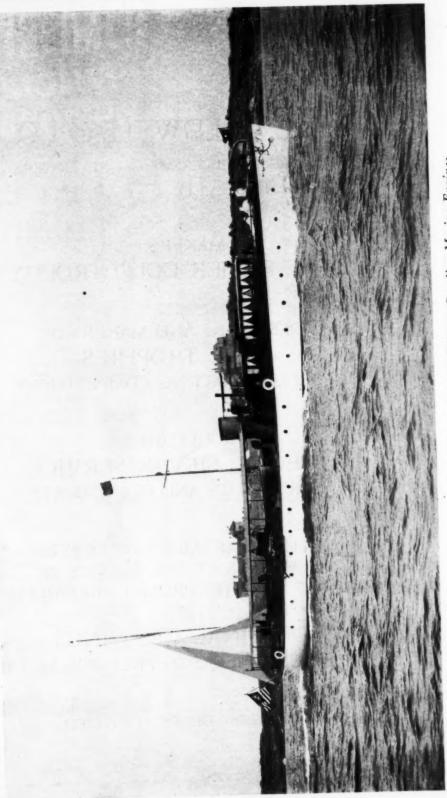
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CORRESPONDENCE IS INVITED



Mr. K. Van Riper's "Alacrity" powered with Winton Gasoline Marine Engines

# SHE'S A LADY" "THE LINER

That was Kipling's way of putting it, and a great many people carry the idea still farther and think a yacht's a matinee girl—good to look at, and all that, but not so hardy after all.

Yet the liner works harder and lasts longer than most men o' war, and there's many a yacht that outspeeds and outlives the plodding work boat.

What sturdy engines the big yachts require! And what play those engines would make of a work boat's task!

Just give that a serious thought. And at the same time, remember that the biggest and finest of mod-

ern yachts—we can give you a long list of them—get their tremendous power from Winton gasoline marine engines. Among these is Mr. K. Van Riper's "Alacrity" pictured above—118' length, 15' 6" breadth, 5' 6" draft—powered with two 9½" x 14" Winton gasoline marine engines.

Admirably adapted for work boats, these engines are. They solve your power problem once for all, and to your profit. So, whether it's a yacht or a work boat that you are building, let us tell you what it is in Winton engines that makes them so ideal for your vessel.

Five sizes, 80 to 200 H.P., six and eight cylinders. May we send you full information?

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### The GIERHOLTT

Direct Drive Outboard MOTOR

FIFTY POUNDS of concentrated pleasure,
—of convenience, labor-saving service and
comfort. Fifty pounds of excellent materials
and equally excellent workmanship. That is
the Gierholtt Direct Drive Outboard Motor,
the greatest little detachable rowboat, or canoe
power plant ever designed. It's a joy, not a toy.

This motor is the lightest, the simplest, the easiest to carry, attach, start and operate. The steering handle also makes an excellent handle for carrying. The propeller is removable. You can take it apart for packing, the heaviest part weighing less than 40 lbs. No gears to add weight and consume power.



2 H.P. Price \$75.00

F. O. B. Marine City. Battery Ignition, Fresh Water Fittings

The Gierholtt makes your rowboat, tender or canoe a real motor boat, capable of good speed and ready to run wherever there's water enough to float the boat, regardless of weeds, sunken logs or rocks. The propeller is protected. A youngster can carry it, attach it to the boat, start the motor and run it anywhere.

Buy a Gierholtt for your tender, or for your vacation rowboat. Battery or Magneto ignition. Can also be used as an inboard motor. The most economical means of water transportation.

Write to-day for catalog and name of nearest dealer

### GIERHOLTT GAS MOTOR COMPANY MARINE CITY, MICHIGAN

The ability to run at full speed in the shallowest water is a most important feature—possible only with the Gierholtt Direct Drive. Should the propeller become fouled with weeds, swing it inboard like this (without removing) and you can free it instantly. You can steer perfectly and turn the boat in its own length.



### Four-Cycle Marine Motors for 1921

(Continued from page 88)
150 to 200 Horsepower Four-Cycle Motors

|  |                |                 |                  |                  | Location |        |                       |                  |  |
|--|----------------|-----------------|------------------|------------------|----------|--------|-----------------------|------------------|--|
|  | Rated<br>H. P. | Motor           | No. of<br>Cyls.  | Bore &<br>Stroke | R.P.M.   | Wt.    | Valves                | Ignition         |  |
|  | 150            | Automatic       | 6                | 81/4×10          | 500      | 9,200  | Y.                    | J. S.            |  |
|  | 150            | Automatic       |                  | 103/x15          | 250      |        | T                     | J. S.            |  |
|  | 150            | Buffalo         | 6                | 10 x12           | 300      | 12,800 | Î.                    | Dbl.             |  |
|  | 150            | Doak            |                  | 936x11           | 300      | 18,000 | H                     | M.               |  |
|  | 150            | Speedway        | 6                | 5%x7             | 1,200    | 1,900  | L                     | M.               |  |
|  | 150            | Standard        | 6                | 832x11           | 400      |        | H                     | M. & B.          |  |
|  | 150            | Sterling        | 4                | 534×634          | 1,600    | 1,525  | H                     | Dual M.<br>Dist. |  |
|  | 150            | Union           | 4                | 12 x15           | 290      | 22,750 | T                     | M. & B.          |  |
|  | 150            | Van Blerck      |                  | 5%x6             | 1,500    | 1,900  |                       | B. & M.          |  |
|  | 150            | Winton          | 6<br>8<br>6<br>6 | 635x9            | 900      |        | T<br>L<br>T<br>L<br>L | M.               |  |
|  | 160            | Niagara         | 8                | 634 x7           | 1,000    | 3,250  | T                     | J. S.<br>M.      |  |
|  | 160            | Speedway        | 6                | 834x10           | 550      | 5,000  | L                     | M.               |  |
|  | 160            | Wolverine       | 6                | 11 x12           | 330      | 11,765 | L                     | M.               |  |
|  | 170            | Sterling '      | 8                | 516x6%           | 1,200    | 2,600  | T                     | M.               |  |
|  | 175            | Frisco Standard | 4                | 11%x15           | 275      | 22,630 | T                     | Opt.             |  |
|  | 175            | Harris          | 6                | 10 x14           | 225      | 16,800 | H                     | M.               |  |
|  | 175            | Speedway        | 8                | 5%x7             | 1,000    | 2,900  | L                     | M.               |  |
|  | 200            | Automatic       | 6                | 12 x16           | 200      |        | T                     | J. S.            |  |
|  | 200            | Doak            | 4                | 1214x15          | 285      | 30,000 | H                     | J. S.<br>M.      |  |
|  | 200            | Hall Scott      | 6                | 5 x7             | 1,700    | 1,300  | H                     | Delco            |  |
|  | 200            | Speedway        | 6<br>8<br>8<br>8 | 5%×7             | 1,200    | 2,350  | I.                    | M.               |  |
|  | 200            | Sterling        | 8                | 534x6%           | 1,400    | 2,400  | L                     | M.               |  |
|  | 200            | Winton          | 8                | 614x9            | 900      |        | L                     | M.               |  |
|  | 200            | Winton          | 6                | 936x14           | 450      |        | L                     | M.               |  |
|  | 200            | Wolverine       | 6                | 11 x15           | 330      | 16,630 | L                     | M.               |  |
|  | 200            | Van Blerck      | 8                | 534×6            | 1,500 -  | 2,275  | T                     | B. & M.          |  |

Four-Cycle Motors Over 220 Horsepower

|       |                     |      |           |       | 1      | Location | i        |
|-------|---------------------|------|-----------|-------|--------|----------|----------|
| Rated |                     | 0. 0 |           |       |        | of       |          |
| H. P. | Motor C             | yls. | Stroke    | R.P.M | . Wt.  | Valves   | Ignition |
| 220   | Standard            | 6    | 10 x11    | 460   |        | L        | M. & B.  |
| 225   | Union               | 4    | 1436x18   | 225   | 36,400 | T        | M. & B.  |
| 225   | Union               | 6    | 12 x15    | 300   | 30,600 | T        | M. & B.  |
| 225   | Sterling            | 6    | 534×634   | 1,600 | 2,000  | H        | Dual M.  |
| 250   | Automatic Prod. Gas | 6    | 13½x18    | 200   |        | T        | J. S.    |
| 250   | Speedway            | 6    | 11 x12    | 450   | 11,400 | L        | M.       |
| 250   | Sterling            | 8    | 53/2×63/4 | 1,700 | 1,495  | H        | M.       |
| 250   | Union               | 4    | 1534 x20  | 200   | 49,785 | T        | M. & B.  |
| 275   | Frisco Standard     | 6    | 1134×15   | 300   | 28,000 | H        | Opt.     |
| 300   | Doak                | 6    | 1214×15   | 285   | 43,000 | H        | M.       |
| 300   | Standard            | 6    | 12 x14    | 350   |        | H        | M. & B.  |
| 300   | Sterling            | 8    | 6%x9      | 1,000 | 5,600  | T        | Dual M.  |
| 300   | Sterling            | 8    | 5%x6%     | 1,600 | 2,800  | H        | Dual M.  |
| 300   | Union               | 4    | 16 x21    | 210   | 55,700 | T        | M. & B.  |
| 325   | Union               | 6    | 141/4x18  | 225   | 50,400 | T        | M. & B.  |
| 375   | Union               | 6    | 1514×20   | 200   | 69,100 | T        | M. & B.  |
| 400   | Murray & Tregurtha  | 6    | 734 x9    | 1,400 | 3,350  | T        | M.       |
| 500   | Standard Dbl. Act.  | 6    | 1239×13   | 350   |        | T        | M.&B.    |

# Bites Instantly

The WC Navy Anchor takes hold at the first pull of the cable, and the harder the tug, the firmer the hold.

### **WC Stockless Navy Anchor**

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Foul.

Won't Drag.

Solid wrought iron shank; free from "pin hole." Lies in holding position at angle of 55° to flukes, per Navy Specifications. One piece head; no mud gathering pockets. Tripping fin on head absolutely prevents dragging flukes up. Heavily galvanized by hot process. Proper shackle furnished. At your dealer's or write us.

#### Get this Valuable Book

"Sea Craft Suggestions and Supplies"; over 275 pages of useful hints about Moorings, Steering Gear, Compasses, etc. Sent only for 50c.

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vi.



### The Elco Cruisette is a Noble Craft

A Popular Little Sister of the Famous British "M. L." Submarine Chaser

THE Cruisette is the development of years' experimenting in Standardization, for the famous Elco "M. L.s" of the British Navy were the forerunners of the beautiful and staunch little boat which you will see at the New York Motor Boat Show in early December.

Elco has capitalized its wonderful

war experience—and the product is—The Cruisette.

The past season has proved the complete success of this attractive little boat, which is equally at home in the quiet waters of the bay or in the open sea or out on the Lakes. More *Cruisettes* have been sold this year than were ever before sold of any one type of pleasure boat.

The 1921 model is ready and we urge that orders be placed now—thus avoiding the experience of many who this year were disappointed in not being able to secure delivery.

#### ELCO STANDARDIZED MODELS

33-ft. Cruisette, Open and Cabin Model, Speed 12 miles 40-ft. Cruisette, New Double Cabin Model, Sleeps Seven

30-ft. ELCO Runabout - - Speed 20 miles

36-ft. ELCO Express, New Model - Speed 32 miles

50-ft. ELCO Cruiser - 75-HP Standard Engine

Exhibited at the Motor Boat Show, New York December 10-18; 1920

Send for illustrated catalog

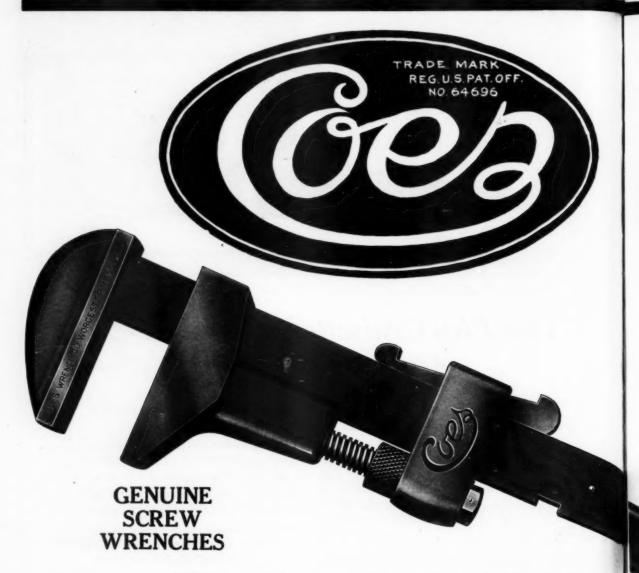
#### THE ELCO WORKS

Main Office and Works
Avenue A, Bayonne, N. J.

Via C. R. R. of N. J. (Liberty St. Ferry)
NEW YORK OFFICE: 11 PINE STREET







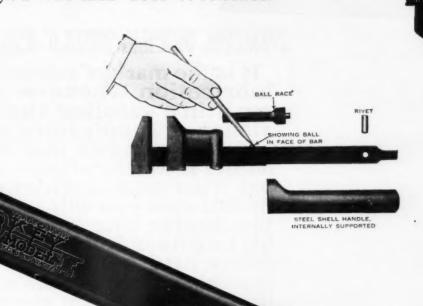
The combined Steel handle and Key Model lines offer a range of sizes from 6" to 72", handling work up to 12<sup>1</sup>/<sub>4</sub>". They will meet your requirements. Ease of adjustment, strength, and proper design make them favorites where the work to be done is hardest.

COES

# The Choice of the Particular Buyer

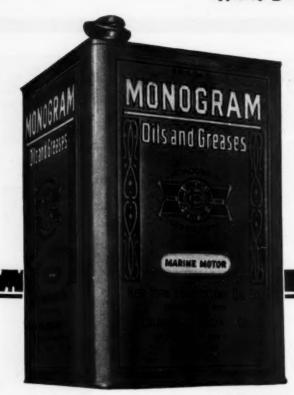
Because he is buying for something besides price. He is after Value. Service and Value and the Coes line have been shipmates for 80 years.

In engine-room or ship-yard, where service and value are shown in work well done, where reliability and strength are expected, and where time saved is all-important, there you will find Coes Wrenches.



Obtain them from your dealer or hardware jobber

WRENCH CO. CESTER, MASS.

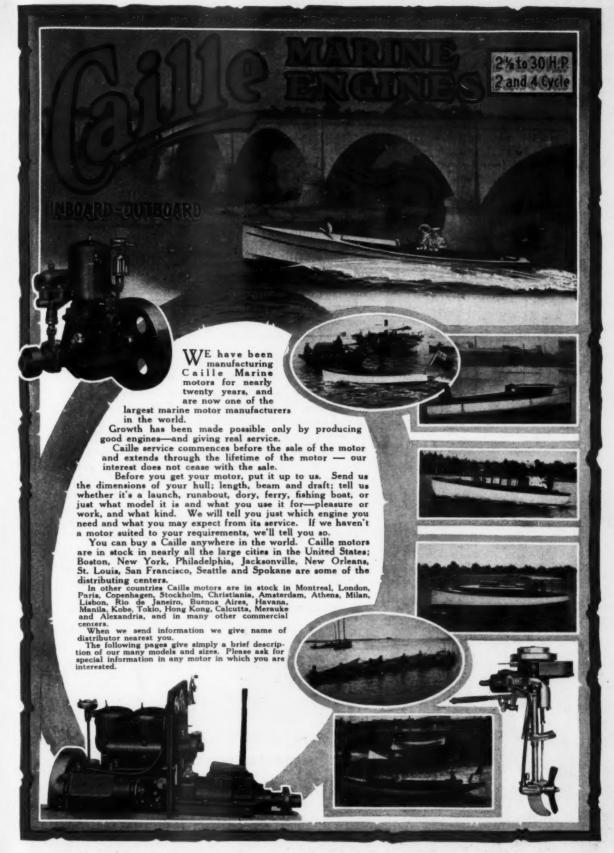


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It is the mark of scientific lubrication.Whenever you see it, in a gasoline supply station, or supply store, you can rest assured that the dealer is worthy of your fullest trust and confidence. By this can you will know the dealer who conducts his business honestly and fairly, and endeavors to give his customers the maximum lubrication service for a fair price. Patronize those dealers handling ···· MONOGRAM.---Insist upon getting it.

The Makers of Monogram

NEW YORK LUBRICATING OIL CO NEW YORK



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## CAILLE

### INBOARD MOTORS-21 to 30 H. P.

The wide variety of types and sizes of Caille Perfection Motors provides a motor exactly meeting the requirements of any boat for any class of service not requiring over 30 H.P. Caille motors range in size from 2½ to 30 H.P. and are built in one, two and four cylinder designs. All Caille inboard motors can be equipped to run on kerosene as efficiently as on gasoline. Let our service department help you select

the type and size of motor best meeting your individual needs. When writing, be sure to tell us the length, beam and draft of your boat. Also speed desired and service for which boat is used.

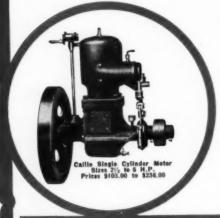


These motors are made in 2½ H.P., 4 H.P., 6 H.P. and 8 H.P. Medium and Heavy Duty models. Furnished for use in fresh or salt water. Battery, magneto or weather-proof ignitor ignition systems. Just the right motors for open boats or small cabin cruisers.

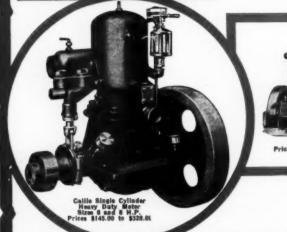
### Caille Double Cylinder Motors

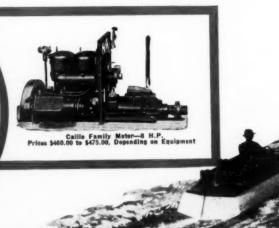
Double cylinder motors in 8 H.P., 14 H.P. and 20 H.P. sizes. Light, compact and sturdy, well balanced and practically vibrationless. Lubrication is as nearly automatic as possible, simple and all parts lubricated by positive oiling system. Cylinders and manifolds cooled by circulating water system operated by plunger pump, the best pump used on marine motors, as it wears slowly and is not ruined by grit. Full brass pump always furnished. Operate in gasoline or kerosene equally well. Battery or magneto ignition as ordered.

Caille Family Motor, illustrated below, is the finest small motor on the market. Electric self-starter and automobile control.









Caille Five Speed Meter Price \$130.00

# AILLE

### **ROWBOAT MOTORS**

We manufacture two models in rowboat motors with exclusive features which cannot be obtained in any other motor for rowboats.

Nothing experimental, but each motor has been used for several years. The little motors are simple, reliable and easy to run. Men, women and children all use Caille rowboat motors.



is the highest development in rowboat motors. It clamps to the square stern of any rowboat by simply turning two thumbscrews. It will drive a boat about 8 miles an hour. Develops about 2 H.P.

This motor provides five positive speeds without varying the speed at which the motor runs. Speed changes are controlled by raising or lowering the steering handle. When in uppermost position you go forward at high speed; by lowering the handle one notch you can travel at trolling speed. You can run up to a pier and stop the boat without stopping the motor by lowering handle to neutral position. When it is desired to resume boating simply drop the handle another notch and the motor will back the boat away from the pier slowly until the pier is cleared, and then by

placing handle in lowest position you can back the pier slowly until the pier is cleared, and then by placing handle in lowest position you can back quickly until you are ready to go forward again. You then raise the handle to highest position and off you go. It's just like operating a big launch.

And you don't have to crank this motor, either. and you don't have to crank this motor, either. It is equipped with a starter. Simply pull a little handle and zip! away you go. So simple and easy a child can start it. Prevents aching muscles and blistered hands. Other features of the Caille Five-Speed motor include a magneto built into the flywheel and water-cooled muffler on a whoms. he flywne Beautifully fin-Used water-cooled muffler on exhaust. Beautifully fin-ished in French gray with polished trimmings. Used in salt or fresh water with no change in equipment.

### iberty Drive ROWBOAT MOTOR

For shallow or weedy rivers and lakes, this motor has no equal. It pivots on the stern of the boat in both up-and-down and sideways movement. It will drive a boat anywhere it will float, and goes through weeds like an eel. Develops about 2 H.P. and sends boat through the water at 3 to 9 miles an hour. Weighs about 72 pounds. Thousands in use.

### The Caille Bantam Motor

While this motor is a bantam in size, it's game as a powerful fighting cock when in action. It weighs only 40 pounds, but it will send a 16-foot canoe along at 9 to 12 miles an hour and a 16-foot rowboat at 7 to 9 miles an hour. Can be easily installed. Ideal for skiff, dinghy, rowboat or canoe. Motor runs forward or backward and has a wide range in speeds.

speeds. Special literature on rowboat motors on request.



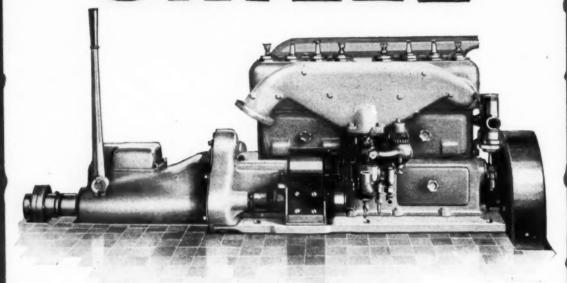
Price \$75.00

Callle Bantam Mot

Caille Liberty Drive Motor Price \$75.00

We also manufacture stationary or industrial engines in sizes from 1½ H.P. to 10 H.P.

## CAILLE



### Aristocrat Motor

Four Cycle

Four Cylinder

Fourteen H. P.

Electric Starter and Light

**Bulkhead Control** 

HE finest motor of its size in the world. It is the ideal motor for launches, runabouts THE finest motor of its size in the fine hand light cabin cruisers up to 35 feet in length.

This motor is entirely enclosed, quiet and clean. All parts are easily accessible through convenient hand hole plates and removable valve covers. Its equipment is the best the market affords. Has "Bosch" magneto, "Schebler" carburetor, "Willard" storage battery, and "Northeast" electric starter—the same kind of starter used on over 500,000 Dodge motor cars. Can be furnished with hand operated rear starter if preferred.

The reverse gear is of our own manufacture, completely enclosed and of the positive action type. Provides forward, reverse and neutral speeds.

Both intake and outlet are cast in a single piece manifold, providing a hot-spot intake, improving carburetion and giving maximum power from minimum fuel. The Caille Aristocrat is the first marine engine to be equipped with the hot-spot principle.

The Caille Aristocrat is finished in a beautiful French gray enamel and has nickel plated trimmings. In appearance, it will harmonize with the most beautiful boat. In service it will meet every requirement of the most exacting user. Send for detailed specifications. Then have your boat builder install the Caille Aristocrat in your boat.





The Home of Calife Perfection Meters. This \$1,000,000.00 Plant and the Entire Calife Organization are at Your Service



The Caille Perfection Motor Co., 411 Caille Bldg. Detroit, Mich.



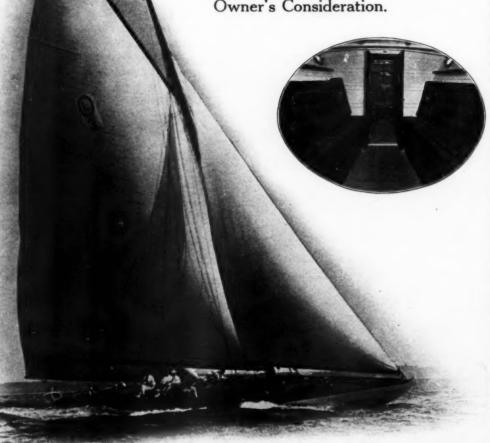
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CHAMPION Spark Plugs are a source of confidence at sea.

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# SINCLAIR OILS AN

1920 GOLD CUP CHAMPIONSHIP

and the

### WORLD'S SPEED RECORD

Averaging 70.4 miles per hour, the "Miss America" won the 1920 Gold Cup Race at Detroit—the motor boat

championship of America.

"Miss America" also broke all world's motor boat speed records from one to thirty miles. In the I mile championship trials for the Lake George Trophy "Miss America" skimmed through the waters at a speed of 77.85 miles per hour—the fastest time ever made by a motor boat.

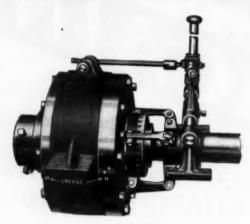
"Miss America" used Sinclair Gasoline and Sinclair

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Special type for race boats and hydroplanes.



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For smaller speed and high powered boats.

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80%-88% Reverse Speed Ratio

Compactness of design, great holding power and absolutely dependable transmission have given Joes Gears first place in the estimation of the foremost race boat owners and builders. They have found Joes Gears the ideal connection between power and propeller. Joes Gears are adaptable to all kinds of speed boats and hydroplanes.

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SELECTED by leading work boat engine manufacturers because of their high reverse speed ratio; smooth, positive action and wonderful durability.

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High reverse speed ratio means efficiency in operating your boat; it means the margin of safety that averts disaster. Smooth, positive action means minimum strain on your gear; the prompt obedience of your propeller to your reverse lever. Durability is the result of right construction, and means the greatest economy in the long run.

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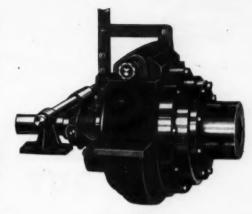
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For Diesel and Semi-Diesel engines 85% Reverse Speed Ratio.



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For medium and heavy duty work boat service 88% Reverse Speed Ratio.

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T'S a shame to scrap a cylinder which has been scored so deep that it won't hold compression. But it's still more of a shame to try to keep such a cylinder in service, with gasoline at the prices prevailing today. There is only one practical and economical solution—let us repair it by the

### Lawrence Patent Process

Our expert workmen electrically fuse a silver nickel alloy into the defects or scores. The bore is not enlarged—the same piston rings fit as perfectly as ever. The Lawrence Process positively cannot warp or harm the cylinders in any way and our work is guaranteed for the life of the motor.

Write us today for quotations, telling size of score or defect or ship your cylinders to our nearest plant at once. Licenses under Lawrence Patent are available.

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We are equipped to handle and repair by the Lawrence Patent Process any size cylinder, from the amaliest auto or marine motor, to the biggest statomary engine. No matter what the size, our repair gives you a cylinder as good ar e repaired perfectly by this pro-

Advertising Index will be found on page 196



## The Old Reliable

POWER, Speed, Dependability, Durability and Economy are built-in qualities of Palmer Engines. They are strictly high-quality machines, built of the best material obtainable, made in an up-to-date plant and perfected by experienced engineers.

The first successful marine engines built in New England were built by Palmer Bros. Palmer

Engines still embody the same superior qualities upon which their reputation was founded. They can be operated on Gasoline or Kerosene and are

designed to give their rated horsepower at normal revolutions.

Palmer Engines are manufactured in three types—two cycle single and double cylinder type, four cycle medium duty type and our heavy duty type. Palmer Engines are manufactured from

2½ to 85 Horsepower, 1 to 6 cylinders, and are highly satisfactory for pleasure and commercial uses.

Let us tell you the correct size and type of motor most suitable for your boat.

Palmer Bros. Engines, Inc.

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BRANCHES:
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New York,
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### Kermath Marine Motors

Receive a Wonderful Endorsement by the Builders of Mullins' Non-Sinkable Steel Boats

MORE than 60% of America's leading boat manufacturers use Kermath Engines as standard equipment. They equip their boats with what they know are reliable motors to assure themselves of success with their customers.

As the Mullins Body Corporation of Salem, Ohio, states it: "Your hull may be most perfectly designed, it may be strongly and substantially constructed, you may add a most beautiful finish to this hull. In fact, so far as the human eye can perceive, it is a creation of grace and beauty. But if you make the mistake of installing a motor that is not a success you have lost all and your boat is a failure."

The Mullins Body Corporation is the largest builder of stock motor boats in this country. They use more marine engines in one season than any other in the business. Their success in selling motor boats to the public depends to a large extent upon the selection of a motor that gives complete satisfaction to all who are users of their boats.

The Engineering Department of this large corporation, being fully aware of this fact, selected

practically all the best grades of marine motors that were available. In their own plant they conducted a series of most exhaustive tests with these motors.

The result of these tests was the decision to use Kermath Motors as standard equipment in all of their boats.

During the last five years hundreds of the well-known Mullins Non-Sinkable Steel Boats have been powered with Kermath Motors, and they take pride in the unequalled record of not having even one Kermath motor failing to prove satisfactory to its owner.

After five years of continual testing and investigation the world's largest manufacturers of motor boats still continue to use Kermath motors as standard equipment. Is this not an assurance to you, when buying an engine for your boat that by choosing a Kermath your selection will be a correct one?

Write for our interesting free Kermath booklet. Address Dept. "D."

4 Cylinder, 4 Cycle, 12, 16, 20 and 40 H.P. Prices \$450 to \$1650 — Immediate Delivery

KERMATH MYG Co.

Advertising Index will be found on page 196



### A Motor of Extreme Excellence

THE Kermath 40 is a strong, husky engine, designed for the purpose of driving heavy cruisers and working boats. It has the power that makes it dependable for day in and day out service, no matter how large the load or how continuously it is in use.

In order to gain this extra strength, the bearing and all working parts are made extremely large.

The oiling system is clean, quick and efficient. All bearings as well as the Paragon reverse gear being lubricated by pressure feed. The oil is cleaned of all sediments by a screen each time it circulates. This screen can be removed and cleaned while the engine is running. No wrenches are necessary—you can do it with your hands in one minute's time.

All parts of the motor are enclosed. This makes it a unit of cleanliness. It is even practical to install this motor in an engine room painted white. When it comes to operation and control it surpasses the expectations of everyone who has ever handled a motor of this type.

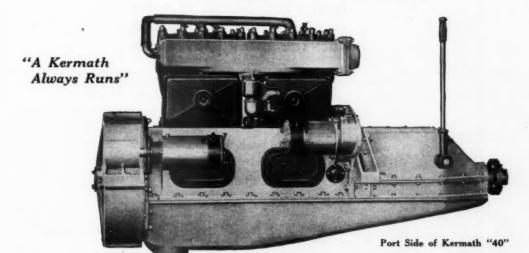
This wonderful Kermath 40 is an example of what good engineering can accomplish in producing an extremely smooth operating marine motor.

Good design, painstaking workmanship and careful assembly have made this engine that is without an equal.

Back of this motor is the prestige of the Kermath Manufacturing Company, who are the recognized builders of America's most dependable marine motors.

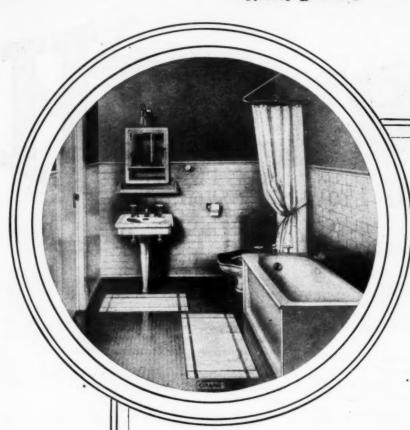
Write us for specifications and information about the Kermath 40. Address Dept. "D."

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KERMATH MYG Co.

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CRANE

# Plumbing Fixtures for Motor Boats

insure equipment of a dependable quality, both in service and appearance.

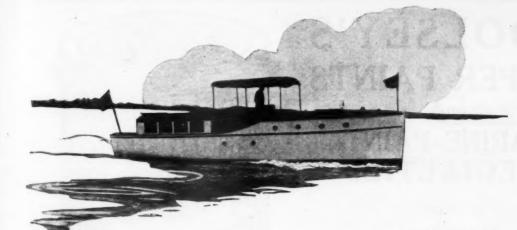
The above illustration includes: a "New Undine" enameled iron built-in corner bathtub, over which is installed a concealed shower with Crane temperature regulator valve. The closet is the "Purus" with open front and back "Whale-bone-ite" closet seat and flushing valve. The lavatory is the "Idalia," supported on leg and fitted with the "Securo" quick draining waste.

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1920

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See the Burger "Boat Beautiful" Exhibit at the Motor Boat Show.

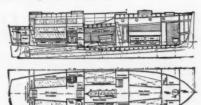
### "A 50-foot Ship"—36 feet long

When clocks were the only time pieces, folks said they could never be reduced to pocket size and be accurate. Yachtsmen, similarly, long doubted that 50-foot quality, efficiency, seaworthiness and beauty—could ever be put in a 36-foot ship.

But today we have watches—and Burger cruisers.

In fact Burger 36-foot cruisers—Mower-designed and Burger-built—go beyond imitation of their bigger predecessors. Like watches, they have accomplished a certain refinement of appearance, nicety of design and detail, balance of power and grace—that makes the bulkier model seem garish and clumsy by comparison.

Every convenience, every luxury, every merit of a 50-foot cruiser—at a 36-foot standardized cruiser price. Write for our new illustrated catalog, describing this cruiser in every detail.



A large bridge deck where all may gather; all controls on bridge deck. Two light and airy cabins with full head room—two toilets. Engine room well ventilated, power plant completely accessible, full head room at forward end. Fully equipped galley. Power plant a Scripps Model D four-cylinder, four-cycle motor; 35 H. P. electric starting and lighting system.

and lighting system.

Speed 11 miles per hour. Marine plumbing, fittings and furnishings of the highest grade. The price, \$4,950, includes complete cruising equipment. Throughout, the boat is superior in every manner to any cruiser of similar character at its price. Thoroughly, substantially and KNOWINGLY constructed. A cruiser of long life, beautiful appearance, comfortable accommodations and highly satisfactory performance.

BURGER BOAT COMPANY, MANITOWOC, WISCONSIN





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Established 1853

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New Jersey, U. S. A.

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-the greater durability of the Doman engine is a welcome economy.

Built oversize, it stands the gaff cuts the cost of boating by eliminating Starting easily and running smoothly, the Doman is ready for any emergency - performing reliably even after years of service.

That's why you'll find no boating investment paying higher returns than this powerful engine.

Giant valves, oversize water-jacket, large bronzebacked bearings and a leak-proof oiling system are Doman features which contribute to the long life and low upkeep of this power plant.

> Special kerosene-burning equipment optional.

> Get the facts about the Doman before you re-engine your old boat or buy a new one.

> > Specifications on Request

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Oshkosh, Wis.

### LAY YOUR PLANS NOW

THE boating enthusiast who devotes some time now to formulating his plans, whether for building or refitting, is going to reap the benefit of greater efficiency, economy and satisfaction in the next sailing season.

He can proceed with the assurance that he will have plenty of company, as more new boats were added to the pleasure fleets the past season than in many years. All signs point to a greater growth and prosperity of the game in 1921 than ever before.

Go to the National Motor Boat Show at the Grand Central Palace and you will obtain many new and valuable pointers which will assist you in perfecting your plans.

In the carrying out of these plans the CARPENTER service will be of the greatest assistance. Our long familiarity with the boatman's requirements enables us to give expert advice and our immense stock facilitates filling orders in the shortest possible time.

Our catalog gives an idea of the amplitude and variety of our stock besides containing authoritative articles on the care and management of all kinds of boats, installation of engines, etc.

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**CHICAGO** 

THERE can, to-day, be no question of right and wrong in engines, whether for work boat or yacht.

THE STANDARD ENGINE is right; proven so by YOUR standard of measurement—SERVICE.

Back of the STANDARD guarantee is the

### STANDARD MOTOR CONSTRUCTION COMPANY

178 Whiton St. Jersey City, N. J.



When writing to advertisers please mention MoToR Boating, the National Magazine of Motor Boating



The Standard Oil Company's Barge, "Delivery No. 5." Powered With a 300 H.P. Standard Engine

# As in War, the STANDARD Serves Greatest in Peace

Just as the World Powers in war standardized their sub-chaser fleets with the STANDARD engine, so are they in peace largely standardizing their fleets with this engine for the even bigger work at hand of serving commerce.

And for the identical reason.

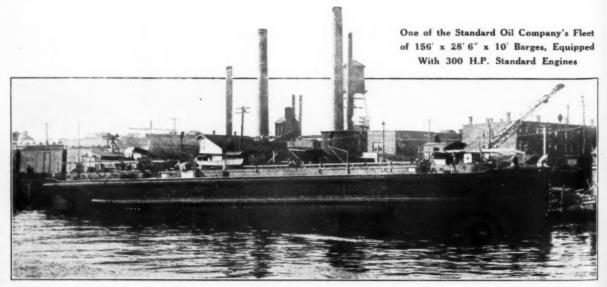
That the STANDARD engine has proven greatest of all as measured by world service.

Back of the STANDARD guarantee is the

### STANDARD MOTOR CONSTRUCTION COMPANY

178 Whiton St.

Jersey City, N. J.



Advertising Index will be found on page 196

Crockett's Spar Composition
is the
only
varnish
which
will last
a season
on
deck

Some varnishes stand ammonia but ammonia is unnecessary around a boat: others stand alcohol which is out of fashion as is known. Crockett's Spar Composition resists atmosphere better than any other transparent finishing material.

THE DAVID B. CROCKETT COMPANY
BRIDGEPORT, CONNECTICUT
THE BISSELL VARNISH COMPANY, Successor

Send for booklet "How to Varnish a Boat" and do it today



LIDWINA

Wins



The Sallan Trophy

### RELIABILITY

Competing against other Express Cruisers, the LIDWINA III returned from the Detroit races in September bearing with her the coveted Sallan handicap trophy.

The LIDWINA III, formerly the SPEEJACKS, was designed and built by us in 1910.

The recent performance at Detroit of this nationally known boat is, naturally, very gratifying to both the owner and ourselves. As builders of both hull and engines, we feel more than proud of her achievement.

The winning of the gold cup by the LIDWINA III after ten years of active service speaks for itself.

CONSOLIDATED

SHIPBUILDING CORPORATION

Exhibiting at the New York

Motor Boat Show

# Sallan Trophy



The Engine Room of Lidwina III

#### **SERVICE**

The record of the LIDWINA III tells the story of our boats and engines—built for service.

For over 35 years we have built more than 3,000 hulls, ranging from 20 to 230 feet in length. We manufacture the famous Speedway engine with which we power our hulls. In the larger yachts we install steam propelling machinery which we also produce at our factory.

There's no mistaking the service that Consolidated built boats render.

Correct in design—built master-fully—skillfully powered.



Exhibiting at the New York Motor Boat Show



Lidwina's Galley

#### THE JOHNSON MARINE REVERSE CEAR

### THE BALL BEARING GEAR



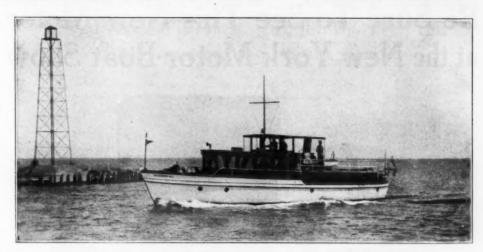
THE Johnson Ball Bearing Reverse Gear is not the development of a day. It has required the accumulated effort of twenty years—marked by constant refinements in reverse gear designs, and by consistent superiority in reverse gear performance—to bring the Johnson Gear to its present perfection, and to its pre-eminent position in the eyes of the boating public.



Address inquiries to Department 25

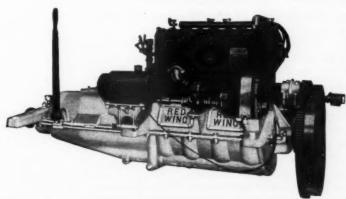
# Red Wing Characters THE MOTOR WITH POWER TO SPARE

### Thorobreds Drive "Cassonia II"



SHE'S a Bear—this "Cassonia II"; one of the largest, roomiest; finest motor yachts in Chicago waters. She's a 60 footer, has 12' 6" beam and draws 4' 8" of water. Her power plant is two model F Red Wing 28-36 H.P. Red Wing THOROBRED Marine Motors. "She does 12 miles an hour", says F. P. Choate, her owner and 10 to 11 cruising. I have never had a moment's trouble with these engines and they are absolutely first class in every respect."

#### The Model F Thorobred



11" are the famous Model F THOROBREDS, 28-36 H.P. detachable cylinder head type—the same as are used with equal success in boats of all types all over the world. The motors in "Cassonia II" are equipped with 12 volt 2 unit electric starters and are fully equipped in every respect. Their bore is 4 1/16", stroke 5"; 2" crank shaft. Like other THOROBRED Models the Model F is practically autopaged in ely peautiful design

The motors in "Cassonia

matic in all operations, is silent, sturdy, trouble proof and of exceedingly beautiful design. Don't merely buy a "motor"—get a real one while you're at it. They burn either kerosene or gasoline.

Get our literature now.

### RED WING MOTOR COMPANY

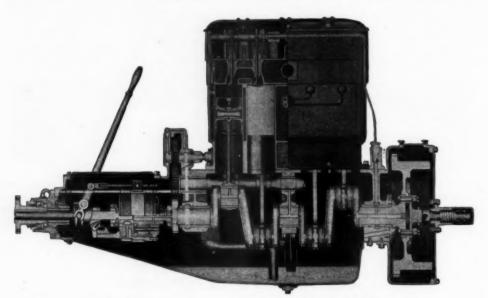
Dept. B

Red Wing, Minn., U. S. A.



"Steady Service"

# Be Sure To See This New Motor at the New York Motor Boat Show



#### The New Knox 20 H.P. Marine Motor

Make a mental note right now that the one thing you must not fail to see at the New York Motor Boat Show is the new Knox 20 H.P. Marine Motor. Plan to give this exhibit plenty of time because you will want to examine the motor and have every feature explained to you if you are interested in the fine points of marine motor construction, or are planning the purchase of a motor of about this size.

This will be the first public showing of the new motor. It is the first popular size marine model produced by the Knox Motors Company, an organization famed for the quality of its products and one of the oldest and best known builders of high grade automotive engines. The appearance of a new marine motor, designed and built in the Knox way, is an event of real importance to every boat owner, boat builder and engine dealer.



"Steady Service"

#### A Quality Motor for Medium Duty or High Speed Work in Fast Runabouts, Medium Size Cruisers and Work Boats

Within the past season or two a new class of engine has been created—new standards of efficiency established.

Up to this time, all of the really notable new types have been in the larger sizes, restricted consequently in both price and power to the largest, fastest or most expensive boats. The 20 h.p. Knox is the first medium size motor in the new efficiency class, suitable for boats of average size.

There isn't a single experiment in the Knox design but all the latest and best principles of automotive engineering practice have been coordinated and combined into a motor which has no equal in the marine market today.

This is a valve-in-head motor, with removable cylinder head carrying all the valve parts. The entire assembly is quickly removable for valve grinding and carbon cleaning. The insides of the combustion chambers and cylinder heads are machined all over, giving absolute uniformity in compression space. Valves are seated directly against the cylinder head without the use of cages, thereby bringing the cooling water directly against the valve seat metal.

The lubrication of this engine is particularly interesting. It is of the full pressure, internal feed type and the oil is carried under pressure to every bearing, including the reverse gear and thrust bearings, rocker arm shaft, circulating and bilge pumps and even the interior of the reverse gear itself!

The following brief specifications will tell you merely whether this is the type of motor for your boat—only an inspection of the motor itself can show you what a remarkable achievement it is.

Four cylinders
Bore 3½,", Stroke 5"
Valves in cylinder head
Removable cylinder head
Valve mechanism enclosed
Single one-piece camshaft
Heated intake manifold

Water cooled exhaust manifold
Large drop-forged crank shaft
ead Noiseless timing gears of special design
head Separate circulating and bilge pumps
aclosed Furnished with or without electric starter
shaft High Tension magneto ignition
old Reciprocating parts carefully balanced
Full pressure internal lubrication

#### And the Price

We are saving this important detail for announcement at the Show. It will be remarkably attractive for an engine of this size and quality. Our plans for quantity production of this model have enabled us to set a price which brings it within the reach of every buyer and builder who wants a real first-class engine of 20 h.p.

If you don't get to the Show, don't fail to write for full description and prices

KNOX MOTORS ASSOCIATES
SPRINGFIELD MASSACHUSETTS U. S. A.



STONE & WEBSTER Incorporated 147 Milk St., Boston Boston, Mass., September 8, 1920

Mr. John L. Shellington, e/o The Gray & Prior Machine Company, Hartford, Connecticut.

Dear Sir:

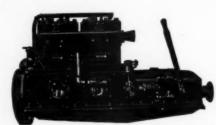
I want to let you know how well satisfied I am with the Gray & Prior engine which I had installed this summer on my forty-foot retuiser. The engine is sturdy and free from vibration and ran perfectly, never giving me a single minute's trouble. I am impressed with the simplicity of the engine and with the excellent design. All the bolts and nuts are received and the gradient of the engine and with the my great at a speed of bout ten miles an hour and the gasoline consumption was at the rate of about 2½ miles per gallon.

If you wish to refer any prospective cus-mers to me. I shall be very glad to tell ben of my experience with your engine, for has certainly been most satisfactory in tomers to not them of my it has cert every way.

(Signed)

Yours very truly, W. H. BLOOD, Jr.

### Experience Built It



Gray-Prior Model D-4, Bore 4½", Stroke 8". Built in one size only.

### Experience Chooses It

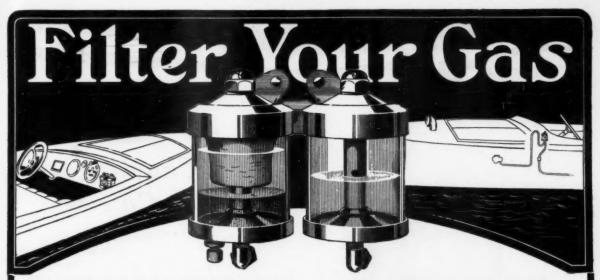
Mr. Blood's unsolicited letter of commendation states that his GRAY-PRIOR Model D-4 is entirely satisfactory in every way and Mr. Blood is only one of many hundreds of GRAY-PRIOR users.

The GRAY-PRIOR embodies all that is practical and modern in marine engine construction, it is the engine that most completely fills the existing need of a "better engine." The GRAY-PRIOR Catalog will be sent to any one interested in a marine power plant that is "built up to a standard—not down to a price."

# THE GRAY & PRIOR MACHINE CO.

56 Suffield Street,

Hartford, Conn., U. S. A.



#### MORE POWER-LOWER

Dirty gasoline causes nine-tenths of your engine trouble. No matter how careful you are your gas is bound to collect dirt, dust and refuse, and water is continually seeping in from "sweating" tanks and pipes. The result is weakened driving power, carbon deposits, constant readjustment of your carburetor, increased running cost and actual danger to your boat and yourself.

# GASOLINE FI

Cleans Your Gas, Increases Your Engine Power and Cuts Running Costs

Feed clean gas into your carburetor and give your engine a chance to make good. Enjoy the pleasure of having an engine that responds to your slightest touch with a verve and life it never had before. How many times have you been in a tight place when you needed power quick to avoid a smash? You'll get it—sure—if your boat is equipped with a Gas-co-lator, because clean gas means sure power and perfect carburetion. That means more engine revolutions, more boat speed, lower fuel cost and greater comfort and safety for yourself and your guests.

#### HOW IT WORKS

Gas-co-lator is a handsomely finished device made of nickeled steel and heavy tested steamgauge glass. It attaches on your instrument board, bulkhead or engine and can be seen in operation at all times. A small pipe taps the feed from the gas tank and runs the gasoline into the left barrel of the Gas-co-lator. There it is strained through chamois—the only perfect strainer—and the cleaned gas run into the right barrel and thence to carburetor and engine. The rust, dirt, water, etc., are drained off through the plug in the water, etc., are drained off through the plug in the bottom. Gas-co-lator is made for use on either gravity, vacuum or pressure feed.

#### WHAT IT DOES

Filters your gas and makes it absolutely clean and pure.

Gets full explosive value from every ounce of

Gives more power and miles per gallon of nates carbon by causing complete combustion. (Carbon is caused chiefly by the unburned im-

purities in dirty gas.) Keeps your spark plugs clean. Gives perfect carburetion and eliminates carburetor adjustments.

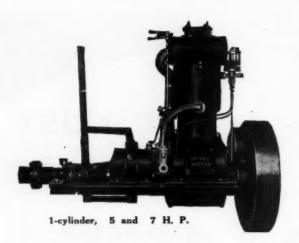
#### FULLY GUARANTEED

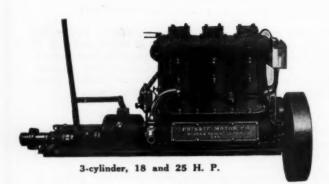
We guarantee the Gas-co-lator to thoroughly clean and filter your gas. If you are not satisfied after a fair trial your money will be refunded without protest. Thousands of Gas-co-lators are already in use. Do it now.

Write for full description, prices and name of nearest dealer. Make it a point to equip your boat with a Gas-co-lator at once if you want to secure the greatest pleasure, safety, efficiency and economy in running your boat. Write us to-day.

VISIBLE GASOLINE FILTER COMPANY, 1426 South Wabash Ave., Chicago, Illinois, U.S.A.







# Charting the Course

SOME twenty years ago a Connecticut engine builder planned a marine motor quite different from any type of marine motor known.

All valves were to open directly into the cylinder heads, and the spark was to fire straight into the combustion chamber. This would center the full impact of the explosion squarely on top of the piston and thus derive the maximum of horse power from the gas exploded.

#### Testing the Chart

Gradually his plans were perfected, and the "Frisbie Valve-in-Head Motor" was constructed and put to the severe test of actual use.

That was 20 years ago. To-day Frisbie Valve-in-Head Motors have made good in practically every field of medium duty service. Fisherman, commercial and work boat owners, and pleasure seekers find their ideal motor in the "Friendly" Frisbie.

#### Frisbie Motor Company

7 College St. Middletown, Conn.



# Frisbie an' I

Meet Us at the

Advertising Index will be found on page 196



#### The Pilot

As the use of Frisbie Valve-in-Head Motors grew general, the valve-in-head advantages became universally recognized and many well known manufacturers are now following the course first charted by that far sighted Connecticut engine builder a score of years ago.

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#### Full Speed Ahead

We are glad of this impetus to the development of marine motors. We believe there is a bright future for the motor boat industry, especially in work boat and commercial service.

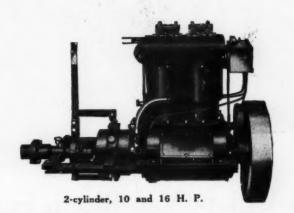
As it is honest in construction, simple in operation, and reliable in performance, the Frisbie Valve-in-Head Motor will render a very vital service in these fields.

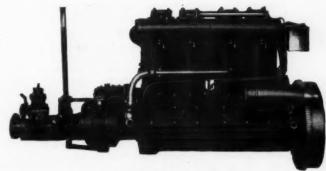
Made in 1, 2, 3, 4 and 6 cylinder sizes, all four cycle, ranging from 5 to 75 H.P.

Catalog and name of nearest dealer on request.



7 College St. Middletown, Conn.





4-cylinder, 30 and 40 H. P.

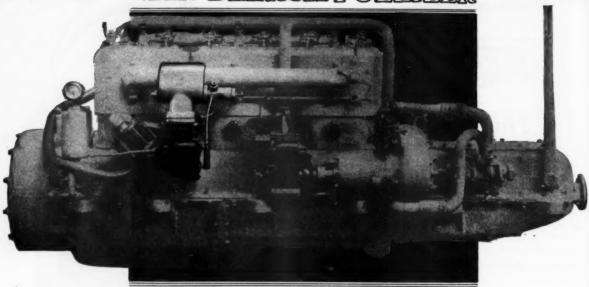


Motor Boat Show

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D

### VAN BILERCK FUEILIZER



### A Unique Van Blerck Engineering Achievement

This exclusive Van Blerck feature now standard equipment on every new Van Blerck engine

WITH the development of the Fuelizer, the Van Blerck engineers have achieved the hitherto impossible—supplying perfect combustion of all grades of gasoline at all engine speeds.

Van Blerck owners enjoy the exclusive assurance of freedom from carbon troubles, spark plug fouling, cold weather starting troubles, dangerous oil dilution and, most important of all, a complete range of speed control from dead slow to full speed instantly without any backfiring or stalling.

Every motor engineer has known for years that the proper application of heat will break up a "wet" mixture. How to apply the heat has always been the problem—now solved by the Van Blerck Fuelizer which applies not only the right

degree of heat at the right place—but more important still—it applies the heat at the right time—when the engine is cold at starting; and maintains an ideal heat—not overheat—under all running conditions.

In brief the Fuelizer works as follows: A small part of the mixture is drawn into the Fuelizer and exploded into hot gas by the spark plug. This hot gas is injected into heater around manifold and into "wet" mixture in the main manifold. It heats up and breaks up the "wet" mixture into a dry vapor, which explodes completely in the cylinders. No time is lost in warming up.

A Van Blerck achievement. Exclusively Van Blerck and now standard equipment on all Van Blerck engines. Write for detailed information.

#### VAN BLERCK MOTOR COMPANY

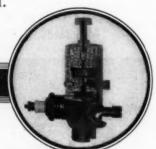
Also Makers of High Duty Commercial Motors

OFFICE AND WORKS AT MONROE, MICH.

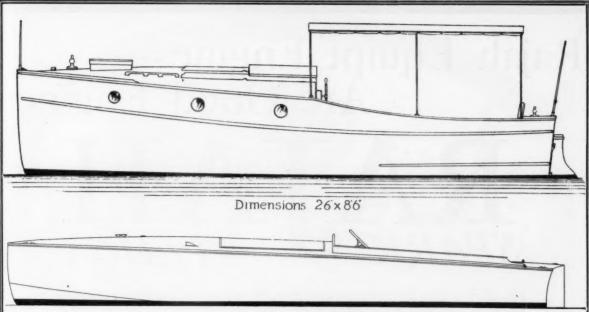
New York Sales and Service Branch--30 Church Street







1920, Rex W. Wadman, Inc.



Dimensions 22'x56'

# The Richardson Standardized Cruiser and Runabout

Knock down frames or complete outfits of the highest type boats at the lowest possible cost. BUILT right at the right price. Boats that will fit the average man's pocketbook. Reliable, sturdy and seaworthy. A runabout that skims delightfully over the waves. A cruiser always ready for week-end trips; designed for those that enjoy fishing and short cruises. Built where quality reigns supreme.

Write for literature.



RICHARDSON BOAT COMPANY

370 Sweeney St.

North Tonawanda, N. Y.

# Rajah Equipt Engines Are Good Engines

# RAJAH SPARK PLUGS

RAJAH equipt engines are good engines, not merely because they are Rajah equipt, but because manufacturers of good engines buy good plugs,—and Rajah Spark Plugs are good plugs.

So when you see a Rajah equipt engine at the Show or on the dealer's floor, or you notice it in the manufacturer's catalog, just jot this down as a visible indication of the builder's honesty of purpose and careful attention to details.

Rajah is one of the oldest and best known spark plugs on the automotive market, and one of the *known best*. It is remembered apart from ordinary plugs, not because of any questionable peculiarity of design, but because of its excellence of construction and consequent excellence of service.

The quality of Rajah service has advertised this plug more effectively than all the printers' ink and magazine space we could buy.

Waterproof Rajah Plug-\$1.50

Standard Rajah Plug-\$1.00

Giant Rajah Plug-\$1.25



The New Waterproof Rajah Plug, designed especially for motor boats. Waterproof, shockproof and break-

#### Try This On Your Marine Engine

IF you have never used a full set of Rajah Plugs in your marine engine, you still have a new boating sensation to experience—the sensation of complete engine confidence. You may not notice much difference the first day or the first week but after a season or so of perfect service without a single misfire or a moment's delay for spark plug trouble you'll realize why Rajah Spark Plugs make and hold so many loyal friends. Buy a set today.

If your dealer doesn't sell Rajah Plugs, send us his name and we will see that you are supplied, postpaid.

The Rajah Thrust Clip, Hook Clip, Short Clip and Primary are finished with ferrules to fit any size cable. Look for the trade mark on every clip.

RAJAH Rajite

Manufactured by Rajah Auto-Supply Co., Bloomfield, N. J., U. S. A.



When writing to advertisers please mention MoToR Boaring, the National Magazine of Motor Boating

# Let a LEBBY SEARCHLIGHT GuideYou

D<sup>O</sup> you use your boat for business or pleasure? In either case you invite accident and even death unless you use at night a dependable searchlight to locate buoys and docks, and to avoid fixed and floating menaces.

The powerful, parallel beam of light projected by a Lebby Searchlight mounted on your deck or pilot house roof makes your course on the darkest night a White Way of safety.

You're safe with a Lebby. Pioneer among searchlights for small craft it has always led in improvements of design and construction and now stands supreme as the most powerful and efficient incandescent searchlight on the market today.

Set your course for the Lebby Exhibit at the New York Motor Boat Show. Examine carefully the latest Lebby Searchlights and have them demonstrated to you.

Don't miss the Lebby Exhibit. If you can't make the Show this year write us for information and prices, giving us the size and type of your boat.



Note carefully these points:
Built of Solid Brass.
Specially Brilliant V-Type Filament
Lamp.
Candle Power (14" size) 175,000.
Less than Four Degrees Beam Divergence.
Picks up Buoys 34 Mile Away.
Focussed from the Outside.
Sizes—7 inch; 10 inch; 14 inch.

Lebby Lighting
Apparatus

WITH Ignition Supply. These outfits (patented) have been in public service for over six years, and have proved themselves of correct design and efficient operation.

On exhibition at New York Show. Send for Special Bulletin.

Lebby Products Department

SOUTHLAND STEAMSHIP COMPANY

Savannah

Georgia

20



### The Burger 36-Footer

Mass production mastered through an honorable record on Government work during the War period, 30 years of experience in the building of high grade boats, and the genius of the veteran designer, Charles D. Mower, have been combined in a noteworthy contribution to the Motor Boat field. The Burger Boat Company of Manitowoc, Wisconsin, is now concentrating every effort on the standardization of a single type, high class, bridge desk cruiser—a safe, roomy, comfortable boat fully equipped with every modern device and convenience.

In keeping with the high standard established by the craft, nothing but an honestly good reliable power plant would do, the final choice being a SCRIPPS Model "D", 4-cylinder, 4-cycle, medium duty motor with electric starting and lighting system. Three of the leading builders of standardized boats have this past year adopted the SCRIPPS as standard equipment, based on performance rather than price.

In cruisers it is particularly necessary to incorporate SCRIPPS reliability and built-in service, in which motor boat men in every clime have always relied upon steadfastly, even before the Scripps-powered "Detroit" made its memorable trans-Atlantic voyage.

Scripps power-plants are used in boats of every description—cruising, runabout, speed, and commercial types. The power ranges run from 10 to 125 horsepower in 2, 4 and 6-cylinder. Some use gasoline exclusively, others are fit for burning either gasoline, kerosene or distillate.

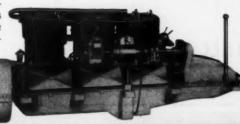


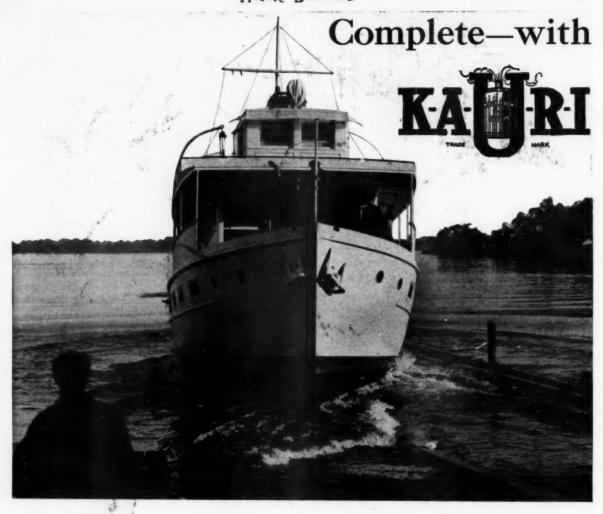
631 Lincoln Ave.,

Detroit, Mich.









WHEN specifications were laid down for the motor house-boat, "Masquerader", it was stipulated that she be finished with the most serviceable and durable varnish that could be found.

And the College Point Boat Corporation, who designed and built her, were determined that the completed job should conform in every particular with their own high standards of design, workmanship and finish.

Therefore, it is particularly fitting that the "Masquerader" has been fin-

ished throughout with Kauri Varnish and Enamel.

Kauri Spar Varnish is used extensively by boat-builders and private owners. It is guaranteed not to crack, turn white in salt water or fresh, or to lose the brilliancy of its lustre.

A cordial invitation is extended to all to visit our double exhibit at the National Motor Boat Show at the Grand Central Palace, December tenth to eighteenth, Booths 26 and 27.

#### BROOKLYN VARNISH MANUFACTURING CO.

Brooklyn, N. Y.

Los Angeles, Cal.



### High Class High-Speed-Pleasure-Craft

Dustin Farnum's "ELEDA"

a HACKER-BUILT 31-Footer, Liberty powered, wins the NORDLINGER-TROPHY, in three straight heats, at Los Angeles, Calif., in very rough water. MISS LOS-ANGELES, also HACKER-BUILT won same race in three straight heats in 1919.

ELEDA is an all Mahogany Gentleman's Runabout, and will do over 50 miles.

HACKER 29 FOOT SPECIAL



Pronounced by Experts, to be the most successful Gentleman's Runabout of its size in America. Powered with the four and six cylindered Hall-Scott motors. Guaranteed speeds not less than 32 and 36 miles per hour.

We have two of these ready for Florida delivery. Better get busy.



"SNAP-SHOT"

HACKER double cockpit type Runabout. Five passengers in forward cockpit. And five in aft cockpit. Her GR-Sterling drives this outfit close to 29 miles.

### 21 FOOT STANDARDIZED RUNABOUT THE BIGGEST LITTLE BOAT EVER BUILT

AN ABSOLUTELY HIGH CLASS OUTFIT, COMPLETELY EQUIPPED SPEED 16 TO 18 MILES

Production will allow this to be sold at a very popular price.

A FEW OF THESE AVAILABLE FOR FLORIDA. Write for full particulars to-day.

#### HACKER STOCK PLANS:

Special Plans Will be Made to Your Order by John L. Hacker—N. A., for Any High Class Job up to 60 Foot. Please Write Your Requirement.

#### HACKER BOAT CO.

Detroit & Mt. Clemens, Mich.

Office: 323 Crane Ave., Detroit

### G.H. MASTEN CO., Inc.

#### Marine Supplies Dealers and Manufacturers

WICKER Furniture of every description for the yacht or for the home. We can furnish anything, either from stock or to your order.



#### Masten's Jacket Type Over-Seas Life Preservers

are approved by the Steam Boat Inspection Service. They carry the Masten Guarantee of service and satisfaction.





Masten's River and Harbor Type Life Preservers

Approved by the Steam Boat Inspection Service are the best that can be produced. Economical in cost, they outlast any in the market. Visit our display show room. If it's for the marine field, we carry it. Motor boats, Motor boats, Motor s, arine e Accessories and supplies

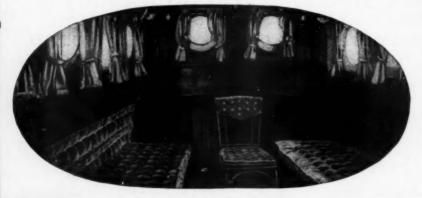


New York Agents for Vulcan Marine Engines and Caille Perfection Motors



Life Preserver Cushions

In standard sizes or made to your order. Decorative and useful for cabin or cockpit.





Send for your copy of our catalogue today.

G. H. MASTEN COMPANY, Inc., New York City Display Showroom, 38 East 9th Street, 1/2 block West of Wanamaker's



# Universal MARINE MOTOR

# Dependable as the Tide

Specialization in building one type of marine motor has developed unusual skill in every department of production. The Universal 9-12 H.P. motor has long been recognized all over the world as a reliable power plant for boats of any type up to 30 ft. Its smooth, masterful delivery of power has made it the chosen favorite of experienced boatmen.

The Universal has been so perfected as to become a standard type. There are no costly yearly changes of models to needlessly increase the price of the Universal motor.

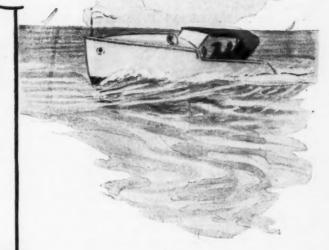
The Universal 4 K.W. Generating Set furnishes steady, flickerless electric light and is as popular as the Universal Motor. It is widely used for lighting boats and boathouses, summer camps and homes.

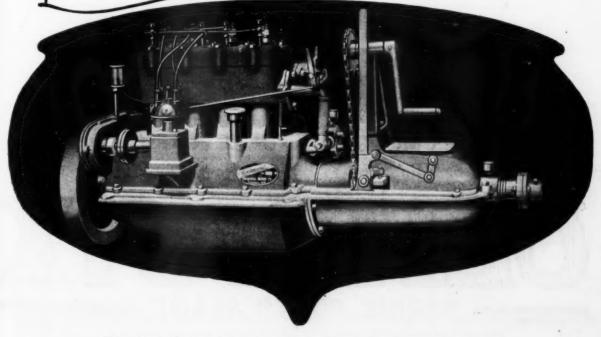
Write for the Universal Catalog.

UNIVERSAL MOTOR CO.

Oshkosh

Wisconsin





When writing to advertisers please mention MoToR Boaring, the National Magazine of Motor Boating

### The Secret of Smooth, Silent, Steady Power



Lewis "Ultra-Six" Marine Power Plant—for Fast Runabouts and Light Cruisers from 18 to 35 feet. Bore 3½". Stroke 5". 25-30 H.P. Four cycle type. Compact enough to replace most four-cylinder engines.

# SIX versus FOUR

YOU never hear the automobilists argue as to which is the most desirable power—six or four cylinder engines. They all agree that the "SIX" is there with quiet, smooth operation,—with that full-chested, even-flowing power that is practically vibrationless.

The Lewis "ULTRA-SIX" will quickly convince any boat owner that such superlative smoothness cannot be secured in any engine of less than six cylinders. The lighter, faster impulses of the six cylinders overlap one another and blend together into a flowing stream of power that seems to drive your boat without effort. The freedom from strain and vibration is easier on the engine, the boat and the operator.

This is the most complete power plant of them all—the last word in marine motor engineering. Every essential to completeness is built into the Lewis at the factory—electric starter, generator, reverse gear, never-failing oiling system, hot spot manifold, etc., are built-in features that have made the Lewis "Ultra-Six" famous. And—because it is made on a quantity production basis, the price is right.

Don't fail to read our catalog before you decide on your motor. Write for a copy today.

LEWIS MOTOR MANUFACTURING CO.

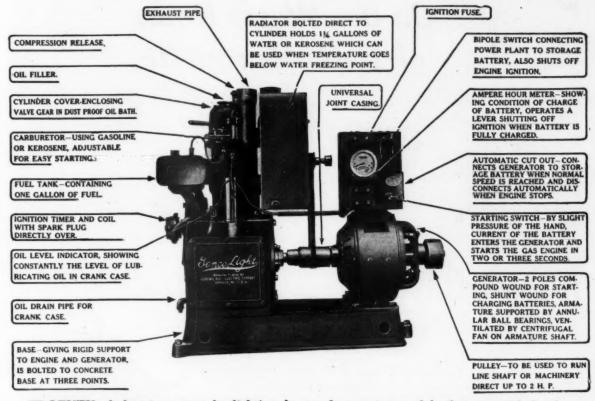
225 S. Main Street

Fostoria, Ohio



Advertising Index will be found on page 196

# Be Sure to See the **GencoLight** Marine Lighting Plant at the Motor Boat Show



PLENTY of electric current for lighting, heat and power is one of the first essentials for the modern cruiser, yacht, houseboat and work boat. No boat can be considered up-to-date or completely equipped for comfort, convenience and pleasure unless it has an ample supply of electricity for illumination, running lights, and searchlight,—electric power for fans, bilge pump, water supply system and radio set,— and electrical heat for toasters, percolators, chafing dishes, etc. This requires a complete independent electric plant, not connected with the main engines of the boat.

Genco-Light is the most practical electric generating system for real boats. It is complete and self-contained, including a powerful self-starting gasoline-kerosene engine, electric generator, storage battery, ampere hour meter and automatic cut-out. It is built in 32 and 110-volt sizes up to 6 KW, suitable for any size or type of boat up to the largest.

The more you know about the fine points of electrical construction, the more will you appreciate the mechanical and electric superiority of the Genco-Light plant. It is built especially for marine use and is now giving complete satisfaction in service on many pleasure and commercial boats, in seashore and summer houses, lumber and logging camps, etc.

If you miss the Motor Boat Show and the Genco-Light exhibit, don't fail to write for catalog and prices today.

Live Dealers and Agents Wanted-Liberal Proposition

GENERAL GAS-ELECTRIC CO., Manufacturers

#### DEAN ENGINEERING COMPANY

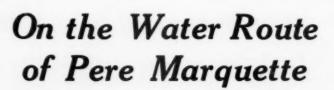
Marine Distributors for Genco-Light

P. O. Box 863

417 William Street

Norfolk, Va.

Agents for Marine and Stationary Gasoline and Oil Engines



Down the long miles of inland waterways, where Pere Marquette's redskins laboriously paddled his birch canoe on its mission of Christianity, countless small craft now speed tirelessly driven by purring Evinrudes.

Wherever navigable water flows you will find the Evinrude. It has brought fishing and hunting grounds within easy reach of sportsmen and has made waterways the playground of nations.

Magneto, built-in-flywheel type, and Automatic Reverse are standard Evinrude features

The leading sporting goods or hardware stores in most localities sell the Evinrude.

Catalog on request.

#### EVINRUDE MOTOR CO.

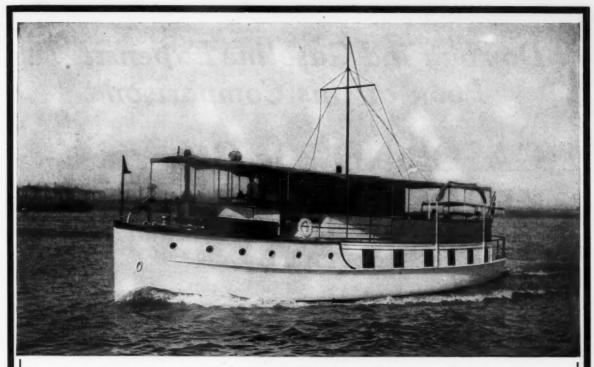
340 Evinrude Bldg.

Milwaukee, Wis.

#### Distributors:

- 69 Cortlandt Street · · · · · New York, N. Y. 214 State Street - - - Boston, Mass. 440 Market Street - - - San Francisco, Cal.
- 211 Morrison Street - - Portland, Ore.





# A Signal Achievement

THE 61-ft. MATHIS-BUILT HOUSEBOAT

Wide-spread attention greets this newest product of the Mathis yards. A matter of minutes for a momentary size-up—then enthusiastic approval breaks. For this 61-footer is a master combination of our 80-ft. and 52-ft. houseboats of last year, with every advantage of the former retained with

#### Lower Operating Cost

as in the smaller boat.

A saving of the sterling, approved advantages of each—a culmination of the finest features born of years of experience in houseboat planning and building.

Note the trim yachtiness of all her lines in photograph above. 16 feet in beam, this boat

#### Draws but 42 Inches of Water

-able to go anywhere, in shallow, tortuous inland streams.

She is equipped with enclosed steering stands; has a large, roomy deckhouse and large after-deck.

We have never turned out a more seaworthy model. Powered with a six-cylinder, 70-90 H.P. Standard Engine, this boat is able to make between 11 and 12 miles per hour.

It is possible that we will shortly have one of these 61-ft. Houseboats for sale-delivered complete in Palm Beach, Fla.

In any event, we can doubtless assist you in securing a houseboat in Florida this season, if you will communicate with us promptly.

#### MATHIS YACHT BUILDING COMPANY

Specialists in Houseboats and Cruisers from 40 to 120 feet.

COOPER'S POINT

CAMDEN, N. J.

We are now building a new 85-foot boat which embraces the very latest ideas in houseboat development and which will compare in comfort with any 120-foot cruiser afloat.

Watch carefully for this announcement-next month.

# Do You Find Gasoline Expensive? Look at this Comparison

# GASOLINE 33c Gal. KEROSENE 19c Gal.



# INSTALL AN OLSENKEROSENE VAPORIZER

#### ON YOUR ENGINE

The Olsen Vaporizer will cut in half the cost of operating your marine engine. Thoroughly tested and improved, it is being used with entire satisfaction in all kinds of boats and on practically all makes of marine engines.

"We have two 30-50 H.P. Sterling engines fitted with Olsen Kerosene Vaporizers. As they have given every satisfaction we now specify that these vaporizers are fitted on all motors we import from the U.S.A."

IMPERIAL MOTOR EXCHANGE LONDON, E.C., ENGLAND "We have recently shipped to our San Domingo office a quantity of Palmer Motors which are equipped with Olsen Kerosene Vaporizers."

J. ARON & COMPANY, INC. 95 WALL STREET NEW YORK, N. Y. "We have an Olsen Kerosene Vaporizer on a Ford 1½ ton truck which we have used every day for over a year with very good satisfaction. It saves 50% in fuel, will go 18 miles on a gallon and does not carbonize any more than gasoline."

N. BERNIER & SONS SOMERVILLE, MASS.



If you want the lowest fuel expense you can secure with complete motor satisfaction and convenience, let us tell you more about the Olsen Kerosene Vaporizer. It is a proved success—you take no chance when you buy it. Note the 100% guarantee below.

Write today for catalog and prices

U. S. VAPORIZER COMPANY 214 State Street Boston, Mass.

#### OUR GUARANTEE

EVERY OLSEN Kerosene Vaporizer is sold subject to our money-back guarantee. The successful operation of the OLSEN is positively guaranteed and the full purchase price will be refunded if for any reason the device proves unsatisfactory.

Advertising Index will be found on page 196

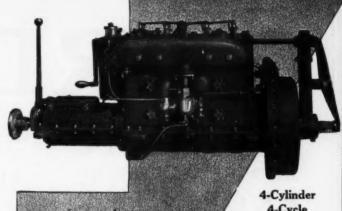
### One of these Will Meet Your Needs

Somewhere in the line of Lockwood-Ash Marine Engines is one that will meet your needs.

From the clean-cut, sturdy 2 h.p. outboard engine to the big four-cylinder power plant are varieties in size to cover a wide range of power and speed requirements.

Fourteen years of experience enable Lockwood-Ash officials to act as your consulting engineers in boat engines.

Prompt and serious attention to every inquiry is a Lockwood-Ash rule.



4-Cycle

Big brother of the Lockwood - Ash En-gine family, a highly developed marine power plant. Rugged and dependable. De-livers up to 20 h.p. Built with or without rear starter.

#### 2-Cylinder 2-Cycle

A light, compact all-purpose engine, of few parts and readily ac-cessible. Made in three sizes, 6-, 8- and 12-h.p. The largest size should deliver up to 15 miles per hour.

#### 1-Cylinder 2-Cycle

A simple, dependable in-board engine for work or pleasure. Easy to start; easy to operate and care for. Made in 2½ and 4 h.p. sizes.

#### Why Lockwood-Ash Engines Are Worthy of Your Choice

Lockwood-Ash Marine Engines are products of an institution which always has placed quality first. Experience has pointed out the sizes that make up the well-selected line and the quality standard has dictated the thorough workmanship which is in every Lock-wood-Ash Engine.

Lockwood-Ash Engines are mechanically sound—not experiments. They are built simple in principle and strong in practice.

#### Ask for the Booklet

Ask for the booklet that tells all about Lockwood-Ash Engines. Also ask about the 30-day trial plan.

#### LOCKWOOD-ASH MOTOR CO.

2007 Jackson Street JACKSON, MICHIGAN

ENGINES

(53)

Outboard Row Boat

Engine

This portable, 2 h.p. engine is a favorite for both pleasure and work. Easily attached to a row boat. Full of pep and thoroughly reliable.

# GORDON

# REVERSIBLE AND FEATHERING PROPELLER

THE Gordon Reversible Propeller has so many advantages over the common reverse gear and solid propeller that there is no comparison except that both are used to control the power and direction of the boat. The reversible propeller does all that the reverse gear can do, and does it better, and furthermore has several additional advantages and exclusive features.

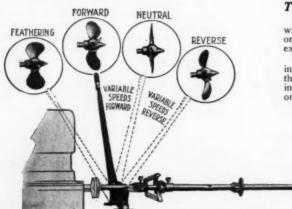
The Gordon is lighter and simpler than any reverse gear. There are fewer working parts to wear or get out of order. It takes practically no room in the boat, a most important feature in many craft. It is easily controlled, from full speed forward to full speed reverse without throttling or racing the engine. A child can understand and operate it.

A big feature of the Gordon is the fact that you can vary the pitch of your propeller at will, to meet the requirements of the boat, the load or the water. It controls boat speed more quickly and accurately than any other method.

How many times have you wanted to experiment with a different wheel? With a Gordon you can instantly set the propeller at the most effective pitch for maximum speed and driving power.

The Gordon Reversible Propeller is made of the very finest materials, accurately machined and assembled. For all sizes and types of motor boats, cruisers, work boats and auxiliaries.

#### Write today for catalog and prices.



# SILENCER AND UNDERWATER EXHAUST



No Noise No Smoke
No Pounding No Odor
No Back Pressure No Heat
Silences exhaust without retarding moto

THE Gordon Silencer and Underwater Exhaust is the ideal exhaust silencer for motorboats. It adds to the comfort and pleasure of boating by doing away with the noise, heat, odor and smoke of the exhaust, and it eliminates the back pressure which slows down the motor when less efficient silencers are used.

#### The Complete Outfit Furnished Includes:

Expansion chamber, under-water exhaust shoe, pipe with locknut for connections through the hull. Street L on expansion chamber. Outboard pipe connection on expansion chamber  $1\frac{1}{2}$  in., for engine exhaust 2 in.

Overflow water from the engine can be led directly into the pipe which leads from the exhaust manifold to the silencer, or directly into the silencer, all pipes leading downward. The water flowing into the chamber not only keeps it cool, but condenses the gases.

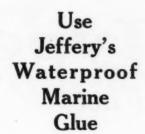
Price \$12.00 F. O. B. Cleveland with Fresh or Salt Water Fittings

Write today for catalog

#### THE GORDON PROPELLER & MFG. CO.

9001 Desmond Ave.

Cleveland, Ohio, U. S. A.







And Enjoy
Every
Minute
of
Your Outing

### DOES YOUR BOAT LEAK?

Send for our Booklets "How to Make Your Boat Leakproof" and "Marine Glue-What to Use and How to Use It"



Any old boat, so long as the frames are in fair condition, can be made water-tight by following the instructions in the above booklets. This applies to anything that floats, from a canoe to a yacht. Wood or steel. Put your leak troubles up to us, and we will help you to stop them.

For more than 75 years Jeffery's Marine Glue has been the choice of the foremost boat builders of the world.

Jeffery's is a product that has not varied from the strict line of qualityit is not a competitive commodity made to meet a price.



#### JEFFERY'S WATERPROOF MARINE GLUE

IN ALL THE VARIOUS GRADES

For sale by all Yacht, Boat and Canoe Supply Houses, Hardware, Paint and Oil and Sporting Goods Dealers

L. W. FERDINAND & CO., 152 Kneeland St., Boston, 11, Mass.

# ==DUNN=== Four Cycle Type

### Kerosene or Gasoline Fuel

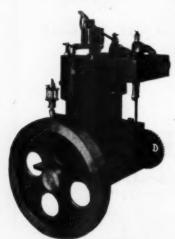


Single Cylinder, 2 H. P. Bore 3<sup>3</sup>/<sub>4</sub>", Stroke 4" \$42.50

Dunn Motors are genuine four cycle motors of accepted design and the simplest possible construction. They are medium duty engines, suitable for pleasure boats and launches, small cruisers and commercial boats. They are smooth running, light in weight, easy to start and very accessible for making repairs and replacements.

We have been building Dunn Motors for several years and today there are hundreds of them in service, not only in the United States and Canada, but also in practically every country of the civilized world.

We can send you copies of testimonial letters from scores of Dunn users, telling of their satisfaction and of the economy, durability, service and pleasure they get. We doubt whether the builders of more expensive engines get so many such letters. The buyer of a Dunn Motor doubly appreciates good service because he knows he got it for the lowest possible cost.



Two Cylinder, 4 H. P. Bore 33/4", Stroke 4" \$75.00

Two Cylinder, 8 H.P. Bore 4<sup>1</sup>/<sub>4</sub>", Stroke 5" \$125.00

#### WHAT A DUNN USER WRITES

"This is to certify that about 10 months ago, I purchased one 12 H.P. Dunn Motor which I had installed in my cabin cruiser, 33½ ft. long by 9 ft. beam, full model boat, and I use this boat in outing trips and have made as high as two hundred miles without a stop. It works beautifully, and my little boy, 13 years old, can and does start motor without any trouble. This motor runs smooth and easy, in fact, is as smooth running as any automobile I have ever used. I consider it the best marine engine made."

(Signed) DR. G. H. HOWARD.



A Dunn Powered Launch

DUNN MOTOR WORKS, Ogdensburg, N. Y., U. S. A.

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# —MOTORS— The Lowest Priced Four Cycle Motors Made

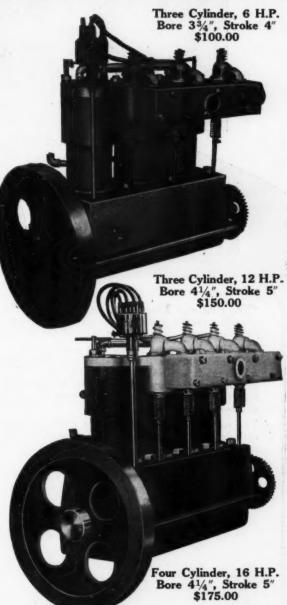
If you are looking for a lot of nickel plating, bright paint and fancy finish, you will be disappointed in the Dunn. But if you want a motor for service, this is the motor you are looking for.

We could spend twice as much money in building Dunn Motors—and they would cost you twice as much—without being a bit more serviceable. Our prices speak for themselves. They cover the bare cost of material and labor. We have figured close and have held both items down to bare essentials because we know there are thousands of boat owners who cannot afford or do not feel justified in paying the high prices charged for most engines today.

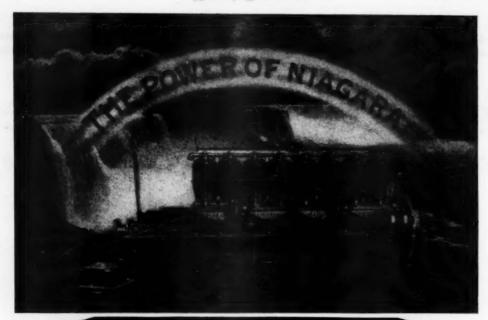
There may be some special satisfaction in knowing you have a high priced engine in your boat, but we believe that there is more satisfaction in knowing you got the best value for your money.

The prices quoted include complete equipment, propeller, shaft, couplings, coil, spark plugs, mixing valves and oil cups. Foreign buyers should add 10% to cover cost of boxing for export and delivery F. O. B. steamer at New York City.

Write today for catalog



DUNN MOTOR WORKS, Ogdensburg, N. Y., U. S. A.



# NIAGARA MOTORS

"The Power of Niagara" is an excellent simile for the power of Niagara Marine Motors. The smooth steady irresistible flow of the world's most famous waterfall is paralleled on a smaller scale by the smooth steady power flow of the Niagara Motor.

The Niagara is a genuinely high grade motor, restricted in production to the number which can be turned out with the individual attention, rigid inspection and careful testing that the buyer of a high grade engine has a right to expect. Obviously the materials and workmanship are the best that money can buy. The present design has been developed from our seventeen years of manufacturing experience, with improvements always keeping pace with the progress of automotive engineering practice.

The superior quality of Niagara design is made apparent by such features as separate T-head cylinders, two main bearings for every crank-throw, long light-weight pistons, carefully ground, accurately balanced and fitted with four rings each, large handhole plates, built-in reverse gears, two complete systems of ignition, etc., etc.

Niagara Motors are being successfully used in every type of boat—runabouts, speed boats, hydroplanes, cruisers, passenger boats, work boats, etc. Medium duty and high speed 12 H. P. to 160 H. P.

Two cylinders and four cylinders,  $4\frac{3}{4} \times 5\frac{1}{2}$ . Four, six and eight cylinders,  $6\frac{1}{4} \times 7$ . Write today for catalog and name of nearest dealer.



#### NIAGARA MOTORS CORPORATION

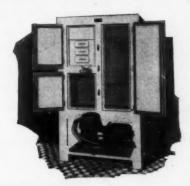
DUNKIRK, N. Y.

THE PARR-LOICHOT ENGINE CORP., General Distributors, 380 Canal Street, New York., N. Y.

20

### FRIGIDAIRE

The Automatic Cold Storage Plant for Modern Yachts, Houseboats and Homes



Inspect FRIGIDAIRE at the Motor Boat Show

Exhibited by Dean Engineering Co., Spaces 34-35

FRIGIDAIRE is more than an automatic refrigerator. It is a complete cold storage plant operated by electricity. It manufactures ice for table and drinking water, and freezes desserts as well as supplying a circulation of dry, non-bacterial cold that preserves any and all food products indefinitely.

FRIGIDAIRE is a complete unit, embodying a beautifully made cabinet unique in refrigerator construction, with a refrigerating unit that is self contained, self starting, self stopping, self oiling and entirely silent in operation. The cost of operation is less than the cost of ice and the mechanism is designed to run indefinitely without attention.

FRIGIDAIRE is particularly desirable for marine use because it is weather resisting and unusually durable. All the elements are non-poisonous, non-inflammable and non-explosive. Two standard sizes are made, one having 9 cu. ft. storage capacity and the other 15 cu. ft. capacity. Voltage may be 104-110 or 250 volts. Built and guaranteed by the General Motors Co.

The Latest Gift of Science

Dry non-bacterial cold Pure as sunlight Colder than frost

#### DEAN ENGINEERING COMPANY

AGENTS

P. O. Box 863

417 William St.

Norfolk, Va.

#### Absolutely Essential Equipment

Safety-Suit

You Can't Chill

Your first duty to yourself, your crew, and your guests is to provide for the peace of mind and safety of everyone on your boat.

There is but one way you can ensure this - by equipping your with boat fully Ever-Warm Safety Suits - one for everyone on board.



Not air-inflated but buoyant in itself the Ever-Warm Safety Suit slips on in a second like a Union Suit. You can't chill, you can't chill,
you can't
drown. When Hawker
and Grieve lost their
air-plane in the Atlantic, they sat on the
wreck with the waves
breaking over them,
warm and dry in their
EVER-WARM Safety
Suits. They may save
your life some day.
Approved and used by
the U. S. Navy.

#### 100 PER CENT SAFETY AT SEA

Every Boat Should Be Fully Equipped with Ever-Warm Safety-Suits

Ocean Voyagers should Ask About Rental Plan. Pamphlet "23-A" tells the complete story.

#### National Life Preserver Company

11 BROADWAY, NEW YORK

Tel. Bowling Green 8609 Territorial Agencies Granted

#### "MORETON GUARANTEED" REBUILT ENGINES

What "Moreton Guaranteed" on rebuilt engines means to you Engines that are taken in trade on new motors only, not for speculation. are thoroughly rebuilt by skilled mechanics in our own shop. That are unsparingly furnished with new parts. That are rigidly inspected and tested. 

That finally reach you in perfect running order.

VAN BLERCK, pair 8 cyl., Mod. M, 200 h.p. practically brand new, used only a few times.

STERLING, pair 6 cyl., Mod. FM, 125 h.p. Dual
2-spark magneto, electric starter, reverse gear.

STERLING, pair 8 cyl., Mod. FS, 200 h.p Dual
2-spark magneto, electric starter, reverse

The above engines will be sold separately or in pairs. VAN BLERCK, 4 cyl., Mod. E, 85 h.p. Dual

2-spark magneto, reverse gear, safety wolverine, 3 cyl. heavy duty, Mod. B, 32 h.p. Make and Break magneto igni-

air pump HERMAN DOCK, heavy duty 40 h.p. dis-tributor ignition, air starter, Paragon

#### WALTER H. MORETON CORP.

Distributors
Quality Marine and Stationary Engines
Marine and Farm Lighting Plants. 214 State Street, Boston 9, Mass.

Exhibitors at the 1921 Motor Boat Show

| (Continued from page 15)  |
|---|
| Pyrene Mfg. Company   |
| Space 73 J. P. Maloney  |
| Red Bank Yacht Works  |
| Pad Wing Motor Company Pod Wing Ming  |
| Space C   |
| Regal Gasoline Engine CoColdwater, Mich.  |
| Space C P. H. Robinson  |
| Space C Richardson Boat Company   |
| Space A 4 G. R. Richardson  |
| Robertson Lubricants CoPhiladelphia, Pa.  |
| Space 51 M. H. Robertson The Rudder Publishing Co New York City, N. Y.              |
| Space 28 A. Patterson   |
| Space 28 A. Patterson The Sea Sled CompanyBoston, Mass.                             |
| Space A 4 E. E. Church Scripps Motor Company Detroit, Michigan                      |
| Scripps Motor Company Detroit, Michigan   |
| Space G 1 Simms Magneto CompanyE. Orange, N. J.                                     |
|   |
| Sinclair Refining Co  |
| Space 66 G. E. Drucquer   |
| Space 61  |
| The C. C. Smith Boat & Engine Co  |
| Space 22-23 F A Spink   |
| Smith-Meeker Engineerng Co New York City, N. Y.                                     |
| Space 30-31 C. G. Meeker  |
| Smith & Serrell   |
| Space 50 The Snow & Petrelli Mfg. CoNew Haven, Conn.                                |
|   |
| Space 67-69 A. T. Nabstedt Sperry Gyroscope Company                                 |
|   |
| Space 91 Sterling Engine Company  |
| Space E C. A. Crigui  |
| Standard Gear CompanyDetroit, Michigan  |
| Space 39 D. A. Mead   |
| Space 58 Stromberg Motor Devices Co   |
| Stromberg Motor Devices Co  |
| Space 75 J. E. Morehouse  |
| Space 75 Space 77 Space 77 Stine Screw Holes  |
| Savannah, Ga.   |
| Stine Screw Holes New York City N V   |
| Space 18-19  I. D. Stine  |
| Space 18-19  I. D. Stine W. & J. Tiebout  New York City, N. Y.                      |
| Space 18-19   |
| Toppan Boat Mfg. Company  |
| Topping Brothers New York City N V  |
| Space 46-48 I. N. Topping   |
| Valentine & Company New York City, N. Y.  |
| Van Blerck Motor Company  |
| Van Blerck Motor Company Monroe, Mich.  |
| Space F1-F2  B. H. Downing  |
| Van Blerck Motor Company  |
| The Wheeler-Schebler Carburetor Co Indianapolis, Ind.                               |
| Space 56 R. Weston  |
|   |
| Space 87-89 S. J. Baisden Winton Engine Works. Cleveland, Ohio Space M A. G. Griese |
| Space M A G Griese  |
| Space M  Wisconsin Motor Mfg. Co  |
| Space B 7 T. M. Fenner  |
| Wolverine Motor Works Bridgeport, Conn.   |
| Snace L. G. E. Clark  |

#### Standardizing the Standardized Boat (Continued from page 25)

Space L
C. A. Woolsey Paint & Color Co. . . . . Jersey City, N. J.
Space 16
R. W. Zundel Company, Inc. . . . . New York City, N. Y.
Space 74-76
F. R. Zundel

turning its huge plant which had been expanded in manifold manner to accommodate the rush of war work that the Electric Boat Company began to cast around for a plan whereby the plant could be profitably utilized.

For many years the motor car industry had demonstrated beyond all doubt the advantages of standardization of automobiles. There is probably not one man in one hundred thousand who orders his motor car custom built, and the few whose permit this luyury have generally found that if pocketbooks permit this luxury have generally found that if they wished to dispose of these custom built vehicles after they (Continued on page 187)

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ALMOST as many engines as are to be displayed in the Motor Boat Show of 1920 will also be on display in the showrooms of Bruns, Kimball & Co., 153-155-157-159 West 15th Street, between 6th and 7th Avenues.

This stock of over two hundred (200) new and rebuilt marine engines, now on our eighteen thousand (18,000) square feet of floor space, constitutes what is practically a permanent engine show in itself.

It will pay you to look these over before purchasing an engine for your boat.

We are distributors for the following high grade new engines, a stock of which is also on display:

Sterling Kermath Murray & Tregurtha Universal Gray-Prior Peerless Wolverine Missouri Hartford Waterman Doman

Our stock of used machines includes practically every known make and size—of medium, high speed and heavy duly motors. Many with electric starting and lighting outfits.

Machines rebuilt in our own shops by experts of many years' experience, under our direct supervision, are GUARANTEED, and represent a saving of from 30 to 60% to the purchaser.

We are making special inducements to buyers placing orders now for either immediate or spring delivery. By placing orders now the usual spring delays will be avoided.

Bargain list will be sent anywhere free of cost.

BRUNS, KIMBALL & CO., Inc.

TELEPHONE | Watkins 467

153-155-157-159 WEST 15th STREET NEW YORK CITY, N. Y.

#### Motor Boat Shows of the Past

(Continued from page 13)

Motor Co., Isham Co., De Dietrich Co., of Paris, also showed boat named "Pi-Ouit, Second," a French sea-going racer 32 feet long, with 30 h.p. motor boat owned by M. Du Bonnet, a name that brings up fond recollections and pre-prohibition days.

The Second Annual Show was held in the Garden, and again

the tank was a feature affording to boat exhibitors opportunity of operating under power, and also for other attractions in the way of water sports. At this time the Rider, "Mile-a-Minute" boat was shown, on which some wagers were made that it could not run once around the lake, and others that it wouldn't run at all. For lack of a rudder, the exhibitor declined to put it in the water. History fails to record the fate of this remarkable boat.

The year 1907 the motor boat as a show proposition came to its own by severing relationship with the sportsman's end, and the National Associations held their third annual show at the Garden, February 19th to 26th, reducing the usual show period

Garden, February 19th to 26th, reducing the usual show period of two weeks to one week.

In December, 1907, the fourth annual show was held at the Grand Central Palace, but following this date all shows were held at the Garden until the twelfth, when in 1915 the show took place again at Grand Central Palace, where all subsequent shows of the Association have been held.

Since the year 1911, including shows of 1912, 1913, 1914, 1915, 1916, 1917, 1918 and the two shows of 1920, were under the direct management of the Association, as well as two Chicago shows of 1914 and 1915.

These yearly displays of marine engines, motor heats and

These yearly displays of marine engines, motor boats and accessories fundamental to both, have become a function in the social life of New York, indeed an event looked forward to by all lovers of the sport in every part of the country. No one will demure in the statement that they have been interesting and instructive from a technical standpoint, as well as pleasantly attractive to the visitors.

#### What Do You Expect for Your Money?

(Continued from page 22)

building a good motor, and to be in a position to give you quick service when you want it. The war has developed some new makes of motors, but mighty few.

That may be a rough method of selection from the viewpoint

of the new manufacturer, but he must prove his quality, and the best way he can prove it is by asking a high price. Six months ago high prices in most lines did not mean anything in many lines of merchandise, it simply meant that was what the maker was able to get. But, oh, what a change is come, my brethren! The high price is asked now because the quality of the goods demands it. (Excepting coal, of course.) If a manufacturer asks a price higher than his competitor in the marine field today you may bet your last dollar that there is a mighty good reason for it-his goods are worth the price.

You haven't seen any sensational price reductions in marine motors, nor in boats. And you won't because the industry is free from the taint of profiteering. There have been no 100 per cent advances in prices in the marine motor business.

About this quality talk, each year someone breaks into the marine motor field with a lowerised are not find the marine motor field with a lowerised are not find the marine motor field.

marine motor field with a low-priced proposition that makes the other manufacturers look sick. A pile of junk is offered at a low price—and even the low price is too high. I know in particular in recent years of a converted tractor motor offered as a marine motor at a ridiculously low price—a big engine, big power, all the fixings at a price which made the well-known manufacturers of good marine motors of the same power look like the rankest kind of profiteers. But the engine was no good, never had been any good, and never will be any good. And the manufacturer is out of business. The people who bought that engine are stung on the quality of the engine they bought, and also on the parts replacement. The funny part of it is that the same engine was being sold by junk dealers for fifty dollars, these dealers having picked up a lot of odd motors of this construction from another source.

If you want to look through the advertising pages of McToR ticular in recent years of a converted tractor motor offered

If you want to look through the advertising pages of MoToR Boating even two years ago you'll see lots of names of manufacturers who were offering those "bargain specials" which are no longer heard of. They don't last. Why? Because everyone in the vicinity knows whose boat it is which has to be towed in every day, and they quickly learn the name of the engine which is supposed to power the boat. You can't make a poor motor

stay in the business.

Yet, as old P. T. said: "There's one born every minute." So the unreliable manufacturers thrive for a season at least.

If the magazines in the boating field followed the right course in soliciting advertising they would refuse to publish the adver-tisements of any but reliable manufacturers. They would in-vestigate every new engine and prove by marine motor experts that the motor was right, sold at a price which would permit the manufacturer to remain in business under normal conditions before they would run a line of advertising. This method is being used by other publications and it can be followed by the marine publications with safety. In fact, they might save themselves from losses on advertising contracts.

(Continued on page 189)

#### Pepromists Wanted (Continued from page 40)

The level headed, thinking, courteous and earnest working organization has little to fear in the future as the fittest always survive and take their proper place in industry.

The day for real and constructive service and salesmanship

has returned and God help the outfit with too many excuses

and alibis to offer.

Just as many and more people want boats and engines as ever before and they will buy again just as sure as the world goes around.

Credit restrictions and foreign exchanges have retarded business and brought about a necessary caution in buying which will have a most beneficial effect by cutting out reckless and speculative buying.

Our near-past administration was made possible by the resourcefulness of the American people, and not by its own abilities, and these same people will rise to the occasion of changed conditions and keep the industries of the country where

Peptomism is needed in big batches, business has not gone to the dogs, and furthermore it will not go there.

We all have the finest and most substantial future to look

forward to.

Hard work, initiative and courage will surmount every diffi-

culty we might imagine.

Several large and basic industries due to extremely excessive demands, have created reckless overhead expenses and highly inflated prices. They have recently set a fad of price reductions, which they were very well able to make in most instances. Some price reductions have been made as a necessity for

raising ready cash.

We do not want to forget that factory costs are still the basis for figuring prices and that the arbitrary reduction of prices, followed as a fad, is not a healthy practice.

Disastrous results often come from following the sheep and

finding later that you are a goat.

The marine trade generally is a fair dealing trade and has not demanded excessive prices, and I know positively that from present actual costs that lower prices are not available at the present time on fair priced boats and engines.

The marine trade at large should not be classed with the gentlemanly burglars who have dealt in, and controlled the

orld's staples.

Standing on our own feet and working with our own heads and figuring a square deal to our customers, leaves nothing for any of us to fear as far as the future of the marine engine and boat trade is concerned.

#### The New Knox 20 H.P. Marine Motor

(Continued from page 29)

freedom from vibration and is fastened to the crankshaft flange with six alloy steel bolts. These bolts serve to hold the flywheel to the flange and are under a tension strain only. The driving

to the flange and are under a tension strain only. The driving strain is taken through six ground steel thimbles which pass through the crankshaft flange and the flywheel.

Balance. Special attention is given to the accurate balancing of all revolving parts. The flywheel and crankshaft are given a correct balance on special machines designed for this purpose, before being assembled into the motor. Connecting 'rods, pistons and all reciprocating parts are also balanced and weighed, thus reducing vibration and wear to the minimum.

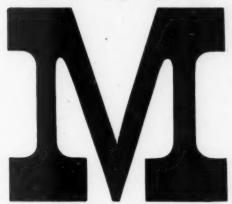
Inspection and Test. Each part entering into the construction of Knox motors must come up to the high standard of Knox inspection or it is rejected. Perfect parts only are assembled into the motor, which must pass stringent tests before being

into the motor, which must pass stringent tests before being finally accepted for shipment. After being first freed up, each motor is run four hours under its own power. It is then connected to an electric dynamometer and must actually deliver not less than its rated horse power before it is accepted. It is then again thoroughly adjusted, tuned up and finally inspected before

shipping.

Installation. Engine beds may extend beyond the motor both fore and aft, thus giving the builder a chance to provide a suitable foundation for the power plant by extending the beds over a number of frames. The centers of the beds are spaced far enough apart to provide a stable motor foundation.

### DON'T MISS PACE



WILL INTEREST IT

AT THE SIXTEENTH ANNUAL MOTOR BOAT SHOW

Held at GRAND CENTRAL PALACE New York City

DECEMBER 10th to 18th, inclusive

This 6-volt Marine Horn combines distinctive marine appearance with a coarse heavy tone. The horn is of the vibrator type, with a very small current consumption; non-arcing, black enamel face, highly polished brass projector for salt water use. 9" high, 4" wide at base, weighs 23% lbs. Price 39.50 This 6-volt Marine Horn com-



Air Compressor
work in either horizontal or al position. Guaranteed pres175 ba. to the sq. in. Cay at 450 R.P.M., 1/4 cu. ft.
inuts. Operates by belt from

rbeel.
R. W. ZUNDEL CO., Inc.
44 Whitehall Street
18: Bowling Green 9157 Naw York



WHICH BOAT WASTES FUEL?

#### WATERMAN MOTORS

LIGHT WEIGHT

LONG LIFE



Arrow

Motor & Machine Co.

727 Frelinghuysen Ave. Newark, N. J., U. S. A.



#### You Can Build Your Own Boat



and save 2/3 the cost By the BROOKS K. D. SYSTEM

Brooks Boats are handsome, seaworthy, up-to-date in design and easy to build. We also build complete boats.

d for catalogue wing all models.



BROOKS MFG. CO., 1101 Rust Ave., Saginaw, Mich.

#### Arrow Motors Are Light Weight

The Arrow Motor and Machine Company, Newark, N. J., are showing a variety of their two-cycle motors, including the outboard motor of 2½ h.p., as well as the 3 and 6 h.p. models. These motors are all well designed to operate for a long period and are made as light as is consistent with good workmanship.

#### Fine Marine Plumbing Fixtures

The J. H. Curtis Company of New York have arranged in their booth an elaborate display of all types of sanitary marine plumbing fixtures. Their line is exceptionally complete and varies in size, type and cost to meet all requirements. Each model has been designed with skill and can be depended upon for quality, service and durability.

#### Barker Motors

Among the adherents to the two-cycle principle of gasoline combustion motors are found the motors made by the Barker Factory, Norwalk, Conn. These are leaders in this line and have been for many years. They are included in the display of Topping Brothers, where all their different models are shown. A Toppan Dory on the main floor is also equipped with one of these motors in the smaller sizes. The motors are durable and serviceable, equipped with make and break ignition or jump spark ignition as preferred.



Cruiser used by the Champion Spark Plug Co. to reach all marine agents

#### Willis Boat Supplies

The E. J. Willis Company, of New York, are exhibiting a complete line of motor boat accessories, included among which are to be found Reverse Gears, Rear Starters, Universal Joints, Clocks, Steering Wheels, Row Boat Motors, Compasses, Cushions and many other items.

#### Valspar Still Popular

Valentine & Co., manufacturers of Valspar, occupy the same position on the balcony that they have had for the past several years, using twin spaces.

They feature big submarines showing Valspar's water-proofness in comparison with other varnishes.

They have immense running-water machines, approximating the effect of a boat going through water and also demonstrating that Valspar will not turn white while other varnishes will.

They have a couple of brand-new rock-about submarine boats in glass tanks, carrying the customary Valspar—Waterproof test.

There are panels showing Valspar applied to almost every kind of wood and the Valspar Enamels in their many, varied, bright shades.

They have in attendance a corps of experts, many of whom have devoted a lifetime to the study of finishes and the finishing of boats.

#### Ker-O-El Electric Plants

Ker-O-El Electric Light and Power Plants are shown by the Ker-O-El Sales Company of Cleveland, Ohio. These plants are ideal for a small boat requiring electric service. They are watercooled, simple in construction and easily maintained.

#### Doman Gasoline Motors

H. C. Doman Company have on display several of their Doman engines. These are heavily built in all parts to stand the heavy work incidental to motor boating. They start easily and run smoothly and are always ready for any emergency, performing reliably even after many years of continuous service. Models adapted to burn kerosene are also shown.

#### Delco Light Marine Sets

Domestic Electric Company show numerous Delco Light Marine Sets. These are made with single-cylinder direct-connected gasoline and kerosene motors and cooled by a blast of air which is driven around the housing of the cylinder by a fan-like arrangement of the flywheel spokes. The electric light and power furnished by these sets makes their owner independent of the main engines for electric service. Accessories of all kinds can be driven either with the battery or in conjunction with the generator and furnish power for all facilities which can be enjoyed in the modern home.

#### Stine Screw Holes

I. D. Stine, vice-president of the Stine Screw Holes Company, is personally in charge of the exhibit of the Stine Hole method of fastening trim and interior work. Various sizes of these screw holes are shown attached to all varieties of material. This is the first time Stine Screw Holes Company has exhibited their products at the Motor Boat Show, and I. D. Stine is personally interested in explaining its many advantages as a time and material saver to all interested visitors.

#### Many Sterling Motors

The Sterling Engine Company, of Buffalo, N. Y., are exhibiting nearly \$40,000 worth of Sterling engines, from the smallest to the largest. A sectional engine of the GR type, cut so as to expose the interior mechanism, is shown and duplicates of the power plants that won the marine motored Express Cruiser and Displacement Runabout Championships this year are on display. In addition to the regular line of Sterling engines, Mr. Harry B. Greening, owner of the Rainbow, has consented to allow his boat to be shown. This is the boat that won the Fisher Trophy. This boat is the finest of its kind. It is planked in the bottom with mahogany while her top and sides and deck are laid in hascolite. She is finished with nickel and aluminum fittings, giving a general color scheme of red and black and silver. The engine is polished all over and the installation, that is, the wiring, was done by the Westinghouse Electric & Mfg. Co. This boat will not compete in any way with American-built boats and is simply placed upon exhibition through the courtesy of Mr. Greening for the information of the boating public.

#### Hyde Propellers

In Space H, on the main floor, the Hyde Windlass Company, of Bath, Maine, are showing their usual line of Hyde Turbine Type and No-Weed Propellers. A prominent feature of this display will be duplicates of the propellers used on the Harmsworth Trophy and Gold Challenge Cup winner, "Miss America." owned by Gar Wood, of Detroit.

#### Flexible Couplings

Francke Flexible Couplings of the marine type for shaft sizes from 34 inches up to 4½ inches and for corresponding duties are exhibited by Smith & Serrell at Space 50 on the mezzanine floor.

For those interested in the details of construction and op-

eration are shown sectional models of the marine type.

Then they also have two demonstrating stands, one using a rigid coupling to connect two shafts, showing how serious the loss of power is with a slight amount of misalignment, and the other showing how freely the shafts run in their bearings even when the shafts are slightly out of line if connected by a Francke flexible coupling.

For those interested in heavy duty direct connected machinery than the shaft are standard to the standard standard to the shaft are shaft are standard to the shaft are shaft are shaft are shaft as a shaft as a shaft are shaft as a shaft as a shaft are shaft as a shaft as a shaft are shaft as a shaft

For those interested in heavy duty direct connected machinery drives, they have models, specifications and drawings, as well as photographs of installations, of the heavy pattern type and double, floating ring type couplings.

There are now some twenty-five thousand installations of Francke flexible couplings transmitting an aggregate of two and three-quarter million horsepower.

#### Belle Isle Boats

The BEAR CAT—A sensation everywhere. Speedy, reliable, and a wonder in performance.

## Four Cylinder HALL-SCOTT

A combination that "can't be beat."

Meet us at the SHOW.

BELLE ISLE BOAT & ENGINE CO. DETROIT, MICHIGAN



8', 10', 12', 14' "Dinks" in stock\_



The BELLE ISLE "BEAR CAT"

Builders of the Famous DAVIS "AMERICAN BEAUTY"
Dingheys, Sail, Power or Rowing. Known the world over.

THE AMERICAN BOAT COMPANY, DETROIT, MICHIGAN

# DON'T BUY A BOAT TILL YOU SEE THE EXHIBIT AT GRAND CENTRAL PALACE

OF THE



**EXPORT OFFICE** 

**FACTORY SALES** 

120 BROADWAY

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CAPE COD

SHIP BUILDING CORPORATION SOLD UP TO 150 FT.

SUCCESSORS TO

LENGTH ON ORDER

CAPE COD POWER DORY CO.

MAIN OFFICE AND WORKS

WAREHAM, MASS.

BUILDERS OF STANDARDIZED BOATS and CRAFT SOLD UP TO 150 FT. LENGTH ON ORDER

NEW YORK SHOW ROOMS

**412 EIGHTH AVENUE** 

"Combination Camp Boat." The boat that satisfies the entire family. Outboard motor boat, sail boat and row boat. Outfit includes boat, oars, sails, spars, rudder, folding centerboard; all fittings, two H. P. Evinrude Automatic Reverse Engine, war tax and crating. White cedar planking, copper fastened throughout and copper riveted at ribs. Salt water fittings throughout. Price \$298. F.O.B. cars Skaneateles. Now is the time to place your order for delivery when camp opens next season.

BOATS OF THE BETTER CLASS

SKANEATELES BOAT & CANOE CO.

Skaneateles, N. Y.

Builders of the Finest Row Boats in the World

ONE WAY ONLY—THE BEST WAY—BUY!

We Sell Our Sets

Wireless for Ship and Land Stations

CUTTING & WASHINGTON RADIO CORPORATION

GENERAL OFFICES
6 and 8 West 48th Street, New York, N. Y.



SPEEDOMETER for MOTOR and SAIL YACHTS

IS THE ONLY KNOWN DEVICE FOR DETERMINING THE EXACT SPEED OF ANY BOAT. ASK FOR INFORMATION

HAMILTON & HANSELL, Inc., 13 Park Row, N. Y. City

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## YALE-

#### Yale Made is Yale Marked

## The Right Hoist for Your Purpose

To Lift Boats in Private Docks For Handling Engines
As a Portable Windlass or Crab for Launching and Handling

FROM the full lines of Yale Spurgeared, Screw-geared, and Differential Chain Blocks, every boating and boat-building need for hand-operated hoisting equipment can be accurately and efficiently met.

Exceptional safety and speed are embodied in the Yale Spur-geared

> Block. Also great all-around, labor-saving efficiency.

> Its planetary gear system and rugged, all-steel suspension parts provide for meeting every test you may put it to, with an ample margin of safety and serviceability to spare.

> Has rapid hoisting speed from small chain overhaul, and holds the load, which will not lower unless the hand chain is pulled.

> Special improvements for great strength, safety, and long wear are: The Yale Safety Hook, which will not break but opens slowly if

3

Yale Spur-Geared Chain Block

dangerously overloaded; Yale Steel Chain, with links electrically welded on the side; Yale Steel Detachable Shackle, for easy interchange of hooks; Yale Steel Suspension Plates, Load Sheave, Driving Pinion, Gear, and Gear Pinion. This gives you "From hook to hook a line of steel."

With a 1-ton Yale Spurgeared Chain Block, one man easily hoists 2,000 lbs. Over 80% of the applied energy results in hoisting energy.

Every block is rated by the long ton—2,240 lbs.—and tested with a 50% overload, or 3,360 lbs. to the ton. Made in sizes from 1/4 to 40 tons capacity.

Whether for occasional use in the private boathouse or for year-'round service in the builder's yard, buy Yale Chain Blocks for satisfactory service.



Yale
Differential
Chain
Block

**Sold by Machinery Supply Houses** 

The Yale & Towne Mfg. Co., Stamford, Conn.

A Hoist for Every Purpose

# BROTHERS HEAVE MARINE

ESTABLISHED
1885

122 CHAMBERS ST. NEW YORK CITY

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# Topping BROTHERS

MARINE HARDWARE OF EVERY DESCRIPTION

Shipbuilding Supplies

Cabin Hardware

Cargo, Boom and Mast Fittings

PORT LIGHTS, ALL DESIGNS AND SIZES

Calking Irons Ship Augers Anchors

CLEATS

Cast Iron Galvanized Brass

ANCHORS Loose Stock
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Folding

Mast Hoops Boat Hooks Life Preservers Treenail Augers Brass Bolts Ship Clamps

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Deck Plates Rudders Anchor and Sailing Lights Ship Scrapers Rowlocks

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BLOCKS Mall, Iron Deck Yacht

> Clinch Rings Turnbuckles Quadrants

#### HARTHAN PROPELLERS

Hawse Pipes Chain Hooks
Fenders Eye Bolts
Bilge Pumps Snap Hooks
Pitch

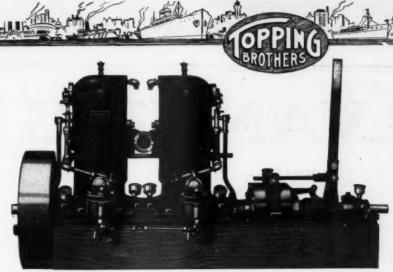
SHIP CARPENTERS' TOOLS

Bow Chocks Stern Chocks Boat Nails

Marine Engines and Equipment

TOPPING BROTHERS

122 CHAMBERS ST NEW YORK



Size "G"-Bore 49/16"-Stroke 5"

Leaders in
2-CYCLE
class for twenty
years and still
supreme in
Durability
Serviceability
Dependability
Simplicity

# BARKER MOTORS

"Imitated but Not Equalled"

## Make & Break with Batteries Jump Spark with Igniter or DOUBLE IGNITION

Barker Motors in all sizes will be displayed at the Motor Boat Show by Topping Brothers in spaces 46-48, Mezzanine Floor.

Also see small sizes in famous TOPPAN DORY and yacht tender in space B-4 on Main Floor.

Four sizes single cylinder. One size with two cylinders.

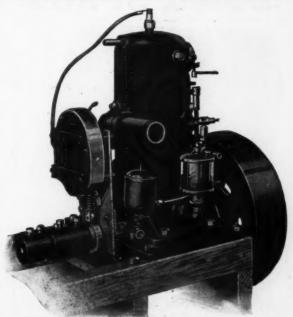
The Barker "Red Letter Book" tells more about this sturdy, reliable engine. Write the factory for Free Copy.

DISTRIBUTED IN NEW YORK BY: TOPPING BROTHERS, 122 Chambers Street.

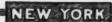
IN MASSACHUSETTS BY:
TOPPAN COMPANY,
101 Haverhill Street, Boston.

Made by

THE BARKER FACTORY NORWALK CONNECTICUT



Size "C" with Double Ignition





# GALVANIZING

The quality of our work is fully up to the high standard maintained by TOPPING BROTHERS in all the products they handle. We are always glad to quote marine manufacturers on galvanizing, tinning and similar work, in any quantity.

#### LEFFERTS GALVANIZING WORKS

MANUFACTURERS OF AND DEALERS IN SPIKES, NAILS, BARS, SHEETS, BANDS and HOOPS. CORRUGATED SHEETS. ROOFING NAILS, LEAD WASHERS, SOLDER, etc. Tinning is one of our specialties.

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## "STAR SPIRIT COMPASSES"



# STAL BOSTON, USA

STAR COMPASS CO. DORCHESTER, MASS.

Manufacturers of
Star Spirit Compasses and
Starco Specialties
Contractors to the U. S. Navy

#### "THE WORLD'S NAVIES"

are sailed by Spirit (alcohol) Compasses. Why? Because they are best by actual test.

STAR COMPASSES are spirit (alcohol) compasses, based on principles over one-half century standing, backed by more than forty years experience.

Just say STAR COMPASS to your jobber or dealer, and get the best to be had, A GUARANTEED trouble and bubbleproof STAR compass.

Our trade mark on every compass protects you; insist on seeing it.

There's a size and style to meet your need. Our pamphlet, "COMPASS POINTS," mailed on request, will give you much valuable information on the compass.



#### Water Soaked Shaftlogs Decrease Motor Boat's Power

Our metal adjustable shaftlog is placed inside the hull, using rubber gasket; stuffing box is also supplied with rubber gasket, thereby insuring a perfectly watertight installation; is easily adjustable to any angle desired. Easily installed in new or old boats.



The only shaftlog constructed to carry a sleeve which prevents moss or weeds from wrapping around shaft stalling the engine. The many advantages together with the low price is making this log very popular.

#### Made in Five Sizes

No. 3 Maximum Bore 13/8" No. 1 Maximum Bore 5/8" No. 2 Maximum Bore 1" No. 3A Maximum Bore 1/2" No. 4 Maximum Bore 2"

Made in Grev Iron, Bronze or Aluminum.

These logs are furnished complete with housing, stuffing box and gaskets at the above prices.

#### Your Hard-to-Start Engines Will Start Easy

If equipped with our double grip clutch couplings

A combination coupling and one-way clutch connects the engine and propeller shaft as firmly as a sleeve or flanged coupling, requires no foundation, easily installed, requires small space. Made of close grained grey iron, will last longer than engine.

This clutch stands paramount among motor boat accessories and is making large and increasing sales daily because of its many advantages and low price. Send diameter of engine and propeller shaft and width of keyways. Made in six sizes.



Pulley Clutches, Line Shaft Clutch Couplings, Double Clutches, Marine One-way Clutch Couplings, Metal Adjustable Shaftlogs and Propeller Wheels

CLUTCHES THAT CLUTCH

#### Famous Positive Grip Marine Clutch Couplings

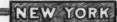
| No. | Diam.  | Wt.     | Max.<br>Bore | H. P. Per<br>100 Revol. | Max. Size<br>Propeller |
|-----|--------|---------|--------------|-------------------------|------------------------|
| 1   | 4 in.  | 5 Lbs.  | 1 in.        | 11/4                    | 11 in.                 |
| 1-A | 5 in.  | 12 Lbs. | 11/2 in.     | 2                       | 13 in.                 |
| 2   | 6 in.  | 14 Lbs. | 11/2 in.     | 31/2                    | 15 in.                 |
| 3   | 9 in.  | 25 Lbs. | 2 in.        | 103/4                   | 20 in.                 |
| 4   | 12 in. | 45 Lbs. | 21/4 in.     | 23                      | 28 in.                 |
| 5   | 15 in  | QO I be | 31/4 in      | 46                      | 36 in                  |

The prices on the above are lower than are offered on any other equipment for the same purposes. Send inquiries to Topping Brothers.

HAVANA

Waterfront between Main and Adams Sts.

ILLINOIS









SHIP CAULKERS' TOOLS

DREW

SHIPBUILDERS' TOOLS

KINGSTON MASS.

MANUFACTURERS of SUPERIOR QUALITY TOOLS

Acknowledged the Best.

Ask the user

CAULKING IRONS CAULKING MALLETS HAWSING IRONS HAWSING MALLETS TREENAIL AUGERS SET AUGERS BOOM AUGERS MARLINE SPIKES

COOPERS' TOOLS COLD CHISELS BOX CHISELS BOX SCRAPERS COPPERING HAMMERS MASONS' HAMMERS **COTTON HOOKS** BOX HOOKS HAY HOOKS





TOPPING BROTHERS, Agents, 122 Chambers St., New York Carry a Stock of Drew's Goods and Can Make Quick Deliveries

COOPERS' TOOLS

DREW

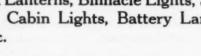
MASONS' TOOLS



## Running and Signal Lights-

OIL OR ELECTRIC

A partial list of our lines includes Combined Lights, Three-way Combination Lights, Sailing Lights, Stern and Anchor Lights, Bow and Side Lights, Fancy Brass Sets, Regulation Pier Lights, Drawbridge and Loft Bridge Lights, Special Trap, Stake and Post Lights, Ferry Boat Side Lights, Pilot House Lights, Deck Lanterns, Binnacle Lights, Station Lamps, Cabin Lights, Battery Lamps and Sets. Etc.



Carried in stock by



122 Chambers Street

New York









20







#### A REPUTABLE TRADE MARK

HJH Quality S

When buying Wrecking Bars, Chisels or Bearing Scrapers with the Illustrated Trade Mark stamped upon them, you can be assured that there are "None Better Made."

The HARROLD TOOL & FORGE CO. Stand Behind All Tools of Their Manufacture

Illustration Below Shows the "HARROLD" MECHANICS' SET

Made from high-grade, warranted tool steel, polished head, blade or taper baked ebony stock.



Specially heat treated for general work. Twelve different tools, assorted, packed in a neat, canvas roll kit.

"GET IN THE HABIT OF ASKING FOR H. J. H. QUALITY TOOLS"



HARROLD TOOL & FORGE CO.

COLUMBIANA OHIO



#### GENUINE HARTHAN PROPELLERS

#### HAVE STOOD THE ACID TEST OF LONG SERVICE

Harthan Propellers installed years ago are giving constant service today. Their reputation has been earned by their ability to withstand punishment that many other wheels were unable to endure.

Harthan Propellers are correctly designed on the true screw principle. The special bronze composition of which they are made is extremely tough, permitting thin blades with sharp edges.

Order a Harthan Propeller for your boat and you will get the highest efficiency from your engine power.

Superiority of Design Durability of Materials Accuracy of Manufacture Excellence of Finish

Made in sizes from 10" to 30" in two blade, and 10" to 50" in three blade.

We will be glad to recommend the correct size and pitch for your boat if you will send us the details of boat and power.

McFARLAND FOUNDRY & MACHINE CO., TRENTON, N. J.



NEW YORK

Advertising Index will be found on page 196



0

# ALLISON

## ALLISON STOCKLESS ANCHOR

(PATENTED)

Mechanically Perfect

Takes Hold at Once

MADE IN ALL SIZES FOR THE SMALLEST YACHT TO THE LARGEST DREADNAUGHT

Approved by
ALL BUREAUS
Used by U. S. Navy



"Strongest and Most Reliable"

Catalogue on request

Manufactured by

ALLISON AND COMPANY

CHESTER PA



#### AMERICAN SAILMAKING CORPORATION

# AMSAILO

TARPAULINS
SAILS
AWNINGS
BOAT COVERS
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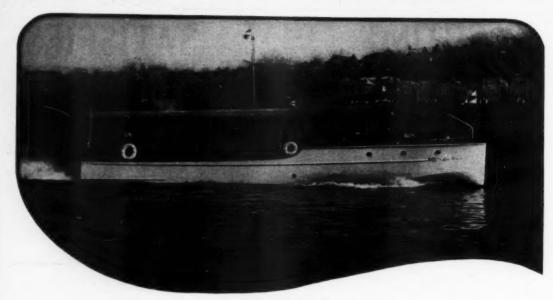
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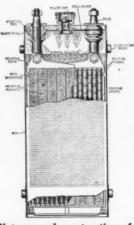
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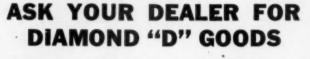
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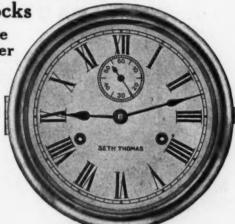


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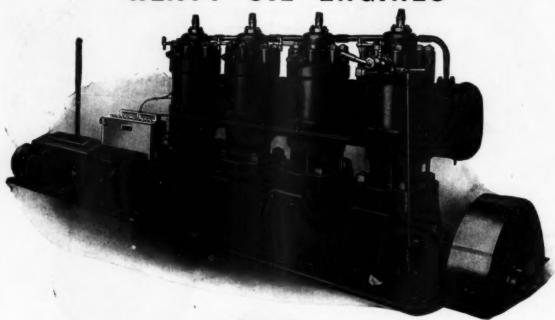
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The moment of presenting along comes in contact with a respect to the propeller action matterly in the part of the well (see illustration below) and the engine threather down. When you beach the bust you seed never surey about the propeller.

The propellies and hope stabilities the best like a content of the engine is the stable engine in the stable engine engin



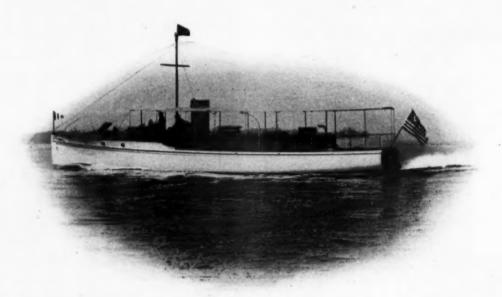
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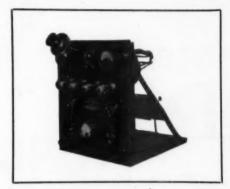
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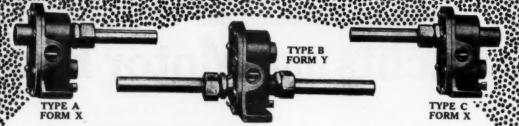
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The Purdy Boat Company offers complete facilities for the designing and building of a limited number of superior quality express cruisers. We believe that by confining our efforts to a few boats of this class, we can give the owner the personal attention to every detail which is unavoidably lacking in a larger production.

MISS MIAMI. Mr. Fisher's entry for the next Fisher Trophy Races is PURDY built.



Length 42 ft. Beam 9 ft.
Runner up—Long Distance Express Cruiser
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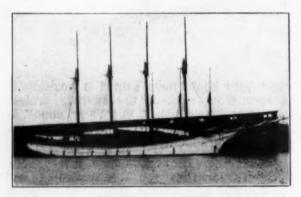
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This type of engine is especially adapted for boats used for propelling POWER LIGHTERS, boats equipped for STEVEDORING and SHIPCHANDLERY work, TOW BOATS and general harbor service.

Ample BORE and STROKE enable "Wolverine" Engines to develop their full rated power at low operating speed. Big sturdy parts, the best of materials and excellent workmanship enable them to maintain their full rated power for the life of the engine.



Canadian Schooner "BESSIE A. WHITE," loaded with 650,000 feet of spruce lumber. 187 feet O.A. by 37 feet beam by 13 feet draft. 200 B.H.P. "WOLVERINE" Engine using PRODUCER GAS fuel.



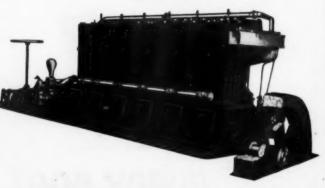
Stevedore Lighter "ELSIE" operating in New York harbor.
65 feet O.A. x 18 feet beam by 4 feet 10 inches maximum draft.
160 H.P. "WOLVERINE" Engine, equipped to use KEROSENE.

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Kerosene (Paraffin) Gasoline (Petrol) Stove Distillate Alcohol Suction Producer Gas

SIZES: 5 H.P. to 200 H.P. 1 to 6 cylinders.

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WOLVERINE MOTOR WORKS, 13 Union Ave., Bridgeport, Conn., U.S.A.

(Formerly at Grand Rapids, Michigan. Established, 1894)



# PAGE(S)

# MISSING



#### Standardizing the Standardized Boat

(Continued from page 152)

were through with them, it was next to impossible to find a purchaser. In short, the buyer of a motor car had been educated to look askance upon custom built cars as experiments. He wanted a machine that had been tried and not found wanting, one that included the experience and improvements in design and workmanship of the similar thousands of cars turned out by the manufacturer.

by the manufacturer.

Why then, was the motor boat industry so radically different? The answer was right at hand. Because motor boats had always been "custom built." No motor boat builder had ever attempted on a large scale the manufacture of a standardized craft. Did that mean that standardization and quantity production were likely to be disastrous in this industry? It might have seemed to some men and some firms that what had been would always be, but to T. S. Hanson, manager of the Elco Works of the Electric Boat Company, it simply offered food for thought—and experimentation.

Mr. Hanson called his experts into conference and outlined to them his ideas about standardization and quantity production. He found them practically all agreed with him on the possibilities offered by such production. There were no crape hangers and dissenters here, for they had all worked on the fighting craft built for the British and American Governments and knew the value of standardization.

and knew the value of standardization.

In their minds it had three distinct advantages: The craft so built were more nearly perfect than individual "experiments" could possibly be, for the designers and workmen by building boat after boat had learned the defects of each and with each new one laid down these were corrected and improvements made.

made.

The Elco Works is concentrating most of its efforts on a 32-foot cabin cruisette, with a beam of 8 feet 6 inches and a draft of 2 feet 4 inches. This was the type that proved most popular last season, although three other types of standardized boats turned out last season will be continued for the coming one. These include a 40-foot cruisette, a 30-foot runabout and a 46-foot season express.

one. These include a 40-foot cruisette, a 30-foot runabout and a 36-foot sedan express.

These boats are now under construction at the Bayonne plant, and scores of them will be ready for delivery at the opening of the boating season. This plan of having the boats ready for delivery, the company found, was one of the most pleasing to prospective buyers, and in every instance the craft were in such excellent condition that the buyers literally took the boats off with them, there being numerous instances where a man would arrive at the Elco Works in the morning, look over a standardized boat, take a trial trip about noon and in the afternoon depart on Newark Bay, chugging away from the plant in his own craft. Some of these boats that were taken from the "shelf" by their new owners made cruises that only had been attempted previously with boats with which the owners were familiar through long association and had been tried and not found wanting, and Mr. Hanson states that of all the craft taken away there was never a purchaser who made the least complaint as to the operation of the motor or the behavior of the vessel itself.

Four of these boats put-putted right out from the launching basin to Boston, two went to Fall River, two to the Thousand Islands, one to Toledo, three to Baltimore and one to Jackson-ville, the latter handled by a group of young men who had never handled a motor boat before and who received their first instruction in the use and operation of the motor on the morning of the afternoon on which they departed for the Far South, and yet they wrote back that the craft had behaved like a "thoroughbred," and they had reached their destination without the least trouble.

This year the standardized motor boats are being constructed in lots of fifty and assembled in lots of an even dozen, and they are designed to meet the requirements of the greatest number of people as the company's experience last season demonstrated. One of the most pleasing features of the standardized boat the company has found has been the tendency of the buyer of one of the craft to purchase another to be used in some other place or for some other service. This is a distinct novelty in the motor boat game where the history has been that a man who built a boat never had another constructed just like it. The lines might be similar and the general specifications almost the same, but he never wanted a second craft identical with the first. There was always something wrong with some details of construction or overation that required a change.

built a boat never had another constructed just like it. The lines might be similar and the general specifications almost the same, but he never wanted a second craft identical with the first. There was always something wrong with some details of construction or operation that required a change.

Details of construction, Mr. Hanson believes, cannot be arbitrarily decided upon over a drafting board any more than an architect can design a home that will prove entirely satisfactory to the owners. Changes without number are usually made in both houses and boats during the process of construction as they take shape and illusions of the owner are dispelled, changes that consume time and money and vex the temper, and it is to eliminate all of these things that the standardized boat has come—to stay.

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This stove has the famous "Khotal" Hydrocarbon Burner. It burns without smoke or smell, automatically generating its own fuel gas from common kerosene.



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ROYAL BLUE STOVES, also made in one, two and three burners, with or without rail.



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#### A Sterling Makes Her Complete

Just as the swan is the most graceful of all water fowl, so is the clipper yacht the admiration of all who are fond of boating. Albert H. Powell's Alta, a 62-footer, is the expression of the finest lines that ever formed a pleasure craft. A min-iature edition of a king's choice, Alta commands the immediate respect of those who view her. She is maintained at New Haven, Conn., and was converted to a motor boat by the installation of a Model FH 8-cylinder Sterling, which drives her at 13 miles an hour. She is familiar to boatmen along the Sound, and her presence in a fleet or at the Yale-Harvard Races lends the air of unnistakable arisocraey which only vessels of her type. tocracy which only vessels of her type

#### Hall-Scott 1921 Marine Engines

The Hall-Scott Motor Car Co., Inc., through its Eastern Sales and Service Branch at Buffalo, N. Y., announces that the same highly successful 1920 model will be continued in 1921 without any major changes.

Hall-Scott design and workmanship have been proven right by test. Hall-Scott engines have come through the entire season of 1920 without the loss of a single bearing, connecting rod, piston, cylinder or other major parts. This is indeed a phe-nomenal performance and is all the more impressive when it is considered that Hall-Scotts are the lightest marine engines on the market today and are used at speeds of from 1400 to 1800 r.p.m. continuously.

The same distinctively Hall-Scott high-pressure oiling system which has shown such wonderful efficiency will be continued

without change.

One of the most prominent of the many Hall-Scott features is their overhead cam-shaft, which completely does away with push rods, guides and multiplicity and du-plicity of parts. This same system has been used in Hall-Scott engines for years with greatest success and is one of the greatest improvements of recent years in marine engine design.

This camshaft was designed originally in 1914 as an improvement on the cam-shaft of the famous "Mercedes" engines, and has been a feature of Hall-Scotts ever since. It was adapted for the famous Liberty airplane motor, as was acknowledged in an official War Department state-

edged in an official War Department state-ment. In fact, the camshaft gears used in the first few Liberty engines were actu-ally supplied from Hall-Scott stock. Another notable feature of Hall-Scott design is the fact that they never have trouble with valve warping. This is largely due to the individual cylinders. with exhaust ports and valves cooled by internal pipes of exclusive Hall-Scott de-sign. Individual cylinders also allow more expansion of metals with consequently less strain on the wearing surface. It is worthy of note that Liberty, Rolls-Royce, Mercedes and many other of the world's best engines also follow this prac-

There are no stock cap screws or bolts of any sort used in the construction of Hall-Scott engines, all these parts being made in the Hall-Scott plant from special alloy steels carefully heat-treated by spe-

alloy steels carefully heat-treated by spe-cially developed Hall-Scott processes. Twelve years' experience in the building of light-weight airplane engines has en-abled the Hall-Scott Co. to develop an ex-tremely accurate method of balancing their engines, so that today every Hall-Scott en-

gine is as perfectly balanced as any special

To properly take care of the needs of Eastern enthusiasts, the Hall-Scott Com-Eastern enthusiasis, the Half-Scott Company maintains a completely equipped Eastern Sales & Service Branch at 39 Associated Service Building, Buffalo, N. Y. This branch carries a complete stock of engine and spare parts always on leading and properly the stock of engine and spare parts always on leading and properly the stock of hand, ready for immediate shipment.

#### Oberdorfer Pumps

The M. L. Oberdorfer Brass Co., Syracuse, N. Y., report a tremendous yearly increase in the use of their bronze geared pumps on marine engines. Most of these are installed for pumping the cooling water, but many are used for lubricating oil or fuel. They are particularly adapted for boat use because every part is rust proof, and because they are positive in action. Every one is tested to pump at least 80 pounds pressure and to raise water three feet without priming. to pump at least 80 pounds pressure and to raise water three feet without priming. The design is such that the volume of liquid pumped is always in exact propor-tion to the engine speed.

One of the Oberdorfer designs is a

pecial type for pumping a variable quantity at constant pressure, or a constant quantity at variable pressure. This type is used especially for such things as pumping fuel oil to several burners or for forced lubrication to several bearings. The adjustment can be changed while the

pump is in operation.



Many engine manufacturers have found it simpler and better in every way to use an Oberdorfer pump as standard equipan Oberdorfer pump as standard equip-ment rather than attempt to build a pump of their own design. These pumps are made in such a complete variety of sizes and types that it is easy to select one readily suited to any particular engine. And it is only logical that a manufacturer specializing on pumps and building many thousands of them can produce a good pump more economically than the engine manufacturer who requires only a few manufacturer who requires only a few hundred.

The big demand for Oberdorfer pumps has forced the company to increase their manufacturing facilities several times in the past few months. A large new factory is now in course of construction.

These pumps are made to withstand the hard use on board boats and are noiseless, automatic and reliable. The supply of water fuel or oil is entirely dependent upon the speed of the motor and in direct proportion to its wants. There is never an under-supply or an excess. A copy of a new pump book will be sent to readers of MoToR Boating on request to the Oberdorfer Brass Co., Syracuse, New York. Whatever the requirement, an Oberdorfer pump will supply the need.

#### Activities on the St. Lawrence

The Thousand Islands this season were the rendezvous for even more than the usual number of tourists, yet but for the motor boat this wonderful region would be practically deserted. It is the lure of the fast motor boat ride that attracts more than any one element, and it is pleasing than any one element, and it is pleasing to note that the number of pleasure craft has increased this season. Alfred Graham Miles has acquired one of the Dual Valve Sterlings for the P. D. Q., and is showing some speed; Doctor George Stevens has been seen in a new and neat little runabout; B. J. Robbins has built a 34 x 7-foot 25-miler for F. L. Brown, of New York, and there were numerous other resplendent craft in evidence last summer. splendent craft in evidence last summer, including some of the Albany Boat Comincluding some of the Amany boat com-pany's 30-footers. Rumors of new craft and races are rife and apparently in 1921 you won't be able to get from one island to another without crossing the furrow left by a sporting speeder. They're going left by a sporting speeder. They're going to cut rings around the islands next sum-

#### Gordon Reversible Propellers

There seems to be a great deal to be said in favor of the latest types of reversible propellers such as are produced by the Gordon Propeller & Mfg. Co., 9001 Desmond Avenue, Cleveland, Ohio. This particular make has been on the market for more than twelve years and has been used in all sizes and types of boats, and in all kinds of service. The makers point out that its long service and

wide-spread use under every possible combination of cir-cumstances has brought them a vast fund of experi

ence and valuable data which has enabled them to improve and perfect it thoroughly from every standpoint, not only in design but also in the mechanical features of

construction.

The most obvious advantage of the re versible propeller is the great saving in three important items—in cost, in weight and in the space occupied inside the boat, and, it might be added, the saving in com-plication and multiplicity of moving parts. There are no friction clutches in the reversible propeller nor small moving parts such as the spur gears, etc., used in reverse

The ability to set the blades straight fore and aft for feathering makes this type of propeller practically a necessity for auxiliaries. Many boat owners have also found it a great necessity because they can control the speed of the boat without throttling the engine by merely changing the pitch of the propeller blades, setting them either for maximum efficiency. setting them either for maximum efficiency

and speed or for low speed.

The Gordon people are also putting out a very popular silencer and underwater exhaust which is sold for \$12.00 complete. This silencer provides for expanding the exhaust gases gradually and cooling them with the overflow from the engine circulating water so that the exhaust is silenced effectively without causing any back pressure on the engine.

#### Hudson Bay Blankets

The Hudson Bay Company are now offering to the American Trade the famous Hudson Bay "Point" Blankets.

It is claimed that these blankets are among the finest in the world for outdoor use. The Hudson Bay Blanket is made of pure Australian long fiber wool.

#### What Do You Expect For Your Money

(Continued from page 154)
Another thing—if you wish to avoid trouble, use only a marine motor for marine work. Some boat owners have been flirting with automobile motors in boats. Would you put a marine motor in an automobile? No matter how good an automobile motor may be, it is no good in a boat. "Liar!" shriek several bugs who have automobile motors in their boats. It's all right. The automobile motor may do very we'll in some boats for a season or for two seasons, but then it wilts.

There is a vast difference between the automobile motor and the marine motor, and they are not interchangeable. The marine

the marine motor, and they are not interchangeable. The marine motor is designed and built to run at full speed all the time; the automobile motor is designed to run at full speed less than ten per cent of the time. The oiling and cooling systems of the auto-mobile motor are not suitable for boat use. Try an automobile motor in a boat in salt water and see how long the water jackets

Don't forget that the marine motor manufacturer is doing his best to build real marine motors and build them right. Remembers to be a good business man, and that he knows that to be ber that he is a good business man, and that he knows that to be successful he must satisfy you with the quality of his motor and with the efficiency of his service.

with the efficiency of his service.

I remember three or four years ago hearing of a change in installation in a racing boat. For some reason one set of engines did not seem to hold up and they were hauled out and a competitive pair installed. The manufacturer whose engines were removed actually cried when the change was made. He didn't cry about the monetary loss, he was rich enough to absorb the loss without embarrassment and the engines were good for resale, anyhow. But he cried because his engines had lost out. That's real manufacturing pride.

That's real manufacturing pride.

That's the spirit which is strong among reputable marine

motor manufacturers.

Don't think the manufacturer is through when he sells you the motor. Every reputable manufacturer sells you an engine with the idea of providing you with a satisfactory power plant. If it proves otherwise you are hurting him and yourself by not saying something about it. In these columns recently a disgruntled motor owner referred to the guarantee as "some high-sounding words, printed in a pretty border, but which mean nothing." Apparently this gentleman has been dealing with an unreliable manufacturer. Probably he has purchased one of the bargains. To every reputable manufacturer the guarantee means exactly what it says, and the real manufacturer is not disposed to quibble about it. He wants to make good.

In spite of the most careful test and inspection there are certain defects which can escape the factory. A blowhole in a cast-Don't think the manufacturer is through when he sells you the

an a cast-tain defects which can escape the factory. A blowhole in a cast-ing may not show up under the most thorough test in the fac-tory, and will not appear until the motor has been in use for several weeks, but the manufacturer will make good if you'll

give him a chance.

Not a single manufactured article has been free from defects in every case since 1916. The man who claims to have had no defective production these past five years is a fool or a liar. Material has been rotten, workmanship indifferent. You must make allowances for the conditions, and if your marine motor has developed defects, you must remember that countless automobiles, sewing machines, welders, tires and any manufactured articles have been just as defective.

Rules for buying a marine motor: Buy from a reputable manufacturer Buy from a long-established manufacturer. Don't buy a cheap motor. Don't expect something for nothing.

Take the dealer's or manufacturer's advice. And you will be sure of a real motor and real service.

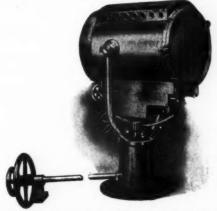
Motor Boating in Shallow Waters

(Continued from page 31)
working out the details of the disappearing propeller feature for many other advantages and conveniences are notable. For example the steering can be controlled from any part of the boat and the power plant is installed so that not a bit of the available seating capacity or room in the boat is lost. As is to be expected in a design which is to be reproduced by the hundreds, careful thought has been given to every detail and all improvements suggested by the first boats put into service have long since been incorporated in the present standard models.

Up in the Muskoka Lakes district of Canada, the Disappearing Propeller boats are almost as common as a certain popular make of automobile on the roads of this country. Summer residents have found it as essential to the enjoyment of a vacation as a cruiser is to the boat enthusiast of New York City. Sales have multiplied wherever the boat is introduced and it is expected that the exhibition of Disappearing Propeller boats at the Motor Boat Show will introduce a new joy to hundreds of persons who have been waiting for a real motor boat for shallow water. The exhibit will be in charge of Mr. F. E. Hewitt, President of the American company, and Mr. W. J. Norwich, Sales Manager.



#### CARLISLE & FINCH **ELECTRIC SEARCHLIGHTS**



have for years been the choice of careful motor boat and ship owners. Made in all diameters, from 7" to 60". Used on every size craft from motor boat and yacht to battleship and ocean liner.

The Carliele & Finch catalog of searchlights will be mailed to any boat owner, builder and marine architect on request

THE CARLISLE & FINCH COMPANY 261 East Clifton Ave. Cincinnati, Ohio

#### **Another New Ideal Book**

#### Ready December 10

Volume III of the Ideal Series Twelve Complete V-Bottom Designs

By William H. Hand, Jr.

#### Prepared Expressly for MoToR BoatinG

The new book which is now on the press will be the most valuable one ever published for the amateur builder or anyone desiring to have a V-bottom boat built by his own builder.

The plans contain outboard profile, lines, inboard, construction and interior arrangement plans, sectional views and complete table of offsets. Accompanying each design is a description of the boat and a full set of specifications taking up step by step each feature of the boat's constructions, how it should be built and the proper material to use.

Plans and specifications of the following boats are included: Edith, a 15-foot runabout; Jane, an 18-foot runabout; Katherine, a 30-foot cruiser; Dorothy, a 25-foot runabout; Zenith, a 25-foot cruiser; Cyclone, a 36-foot auxiliary; Eclipse, a 40-foot express cruiser; Magnet, a 28-foot cruiser; Tornado, a 45-foot auxiliary schooner; Broncho, a 29-foot cruising runabout; Shark, a 21-foot utility runabout; Claire, a 36-foot express cruiser.

(If ordered with the 2 other volumes of the Ideal Series, the price of the 3 books will be \$5.00.)

#### MOTOR BOATING

119 West 40th Street New York, N. Y.

#### A Fine Sea Sled

The Sea Sled Company, Boston, Mass., have brought down a very beautiful model of their famous Sea Sled, 22 feet long and equipped with a Hall-Scott motor. This boat compares favorably with other high class yachts on exhibition and in addition embodies the novel features of Sea Sled construction.

#### Waterproof Magnetos

The Simms Magneto Company of East Orange, N. J., are displaying their regular line of waterproof marine engine magnetos. Some of these are fitted with an enclosed impulse starter which makes certain of easy starting under all conditions. The entire machine is waterproof and as a consequence is particularly adaptable to marine service.

#### Large Size Navy Gears

The Navy Gear Manufacturing Corporation of Port Chester, New York, are exhibiting six different sizes of their navy reverse gears. The two largest sizes are not shown on account of their great bulk. They also show all the various component parts of their navy gear without being assembled. The large number of parts that enter the construction of a gear is thus plainly seen.

#### Debevoise White

The Debevoise W title

The Debevoise Company, of Brooklyn, are featuring their
well-known and much-favored paint, Marine Flat White, the
White That Stays White, ideal for all exterior motor boat painting. Marine Flat White will not blister, crack or peel and
brushes off very gradually with the various washings of the boat
during the season, thereby leaving it in ideal condition for repainting without the necessity of burning or scraping. They are
also exhibiting Fulton Copper Paint Red, and Fulton Copper
Paint Brown, these paints being made with the maximum of
copper metal and other poisons that are most effective in the
prevention of marine growth. This year their exhibit is in
charge of Mr. Frank W. Tibben, attended by Captain James F.
Winans, Captain Frank Day, Thomas C. Wiswall, William H.
Starbuck, Arthur M. Mitchell and Ralph W. Chrystie.

#### Koven Galvanized Ware

L. O. Koven & Brother of Jersey City, N. J., are exhibiting an assortment of galvanized tanks for gasoline, water and air, and in addition various types of engine manifolds and muffler tanks. These are all heavily galvanized, the tanks being fitted with swash plates to check the rush of fluid in them when the boat is in motion.

#### Compact Gray Motors

The Gray Motor Company, Detroit, Michigan, are showing through their New York agents, W. C. Disbrow, several of their two-cycle and four-cycle motors. These are compact little engines developing ample power for their size. Their clean-cut appearance, compactness and strength have made them choice of thousands of pleasure boat owners in the country. The four-cycle motors are four cylinders and develop 25 horse power at 1150 r.p.m. in the smaller size, while the larger model develops 45 horse power at 1000 r.p.m.

#### Caille Output Being Increased

The Caille Perfection Motor Company, of Detroit, Michigan, increased their factory capacity tremendously and are planning on a materially larger output for the coming year. A most aggressive selling campaign is being planned with the idea that this is the proper time to go out and sell marine engines. To aid an increasing production, L. W. Brummet, formerly with the General Motors Corporation, has been placed in charge of the manufacturing end of the business. Especial attention is being devoted to increasing the production on the four-cycle, 14 h.p. Aristocrat motor and facilities providing for a ten-fold increase are installed. The motor is absolutely reliable and controls like a motor car. It requires no effort to handle and is so simple that anyone, even though not a mechanic, can handle it.

Several Aristocrat motors are exhibited, as well as the five-

Several Aristocrat motors are exhibited, as well as the fivespeed model and the Liberty Drive model row boat motors, which are not duplicated nor even imitated by any other manufacturers. These motors are built right, handled easily and stand up under hard use.

#### American Balsa Products

Motor boating enthusiasts, lovers of the water, will find in the American Balsa Company, Inc., exhibit at this year's Show several new uses of Balsa that will add greatly to the enjoyment of next summer's cruises.

This very light wood, familiar to many in the popular Balsa Buoyants seen on the beaches during the last two seasons, also possesses in a high degree the property of insulation against heat. This, together with its structural strength, makes Balsa the ideal material for the construction of refrigerated spaces on yachts and for ice boxes of all sizes, from the lunch kit up.

The company is placing on the market this year two types of insulated luncheon kits particularly designed for use on motor boats and on automobiles. The fibre, Balsa-lined box is 30 x 11 x 16 inches high, completely equipped with a tray containing silverware, cups, plates, etc., and with spaces for two thermos bottles. Beneath the tray is a compartment capable of holding eleven pounds of ice and on each side of it there are compartments in which food can be kept cold for at least forty-eight hours. The other type is of pressed steel 30 x 11 x 15 inches high, with an ice capacity of nineteen pounds, with the entire inside space insulated, and without a tray.

#### Genco Light Sets Shown by Dean

The Dean Engineering Company, of Norfolk, Va., are exhibiting 32- and 110-volt Genco-Light Marine Sets. The 32-volt outfit is arranged for operation during the show and will be practically in continuous service charging the batteries at the exhibit. A number of the auxiliaries which are adaptable for marine use are being shown connected directly to this generating set under conditions similar to those found in actual service. In addition to the generating set a Frigidaire Refrigerator is shown operating on the power generated by the Genco Set shown. This refrigerator has many advantages for boat use and requires only a small amount of current to maintain proper cooling conditions. It further has capacity enough to freeze sufficient water to supply all the ice required for table consumption.

#### A New Portable Motor

The Gierholtt Gas Motor Company, Marine City, Michigan, are showing a novel form of portable row boat motor which is so arranged that the propeller can be swung inboard in case it is fouled with marine growth or weeds. Specimens of their 2 h.p. motors with battery and magneto ignition, as well as an inboard model of the same horse power are displayed for inspection.

#### Nautical Equipment

Nowadays no boat can be considered to be properly equipped unless it has a full set of navigational aids on board. Included in this is a first-class compass which, by reason of the dependency which the navigator must place in its accuracy, must be absolutely flawless. The compasses manufactured by E. S. Ritchie & Sons have long enjoyed an enviable reputation as first-class instruments. Their great magnetic force makes them easily adjusted

to ships of all sizes, and steel vessels do not affect them as much as might be imagined.

#### Latest Hacker Runabout

The latest conception of the modern upto-date runabout is from the board of John L. Hacker, of Detroit, Mich., and, like all designs from this famous architect, may be taken as an authoritative indication of the trend of design in 1921 runabouts.

The forward cockpit, equipped with complete controls, which made such a decided hit in 1921, has been increased in size so that four or even five passengers may be seated in comfort and entirely free from spray of any kind. This, of course, is only possible when a light high-speed engine is used. The particular design under discussion is of a 28-footer with six feet 9 inches beam, which is now under construction by the Hacker Boat Co. for a Los Angeles, Calif., client for use on the Pacific and San Pedro Bay.

The power plant will be a four-cylinder 125 h.p. Hall-Scott marine engine which, on account of its reasonably light weight and smooth running qualities, is particularly well suited for installation in boats of this type. With this engine a speed of from 32 to 34 miles should be attained with ease.

The construction details of this craft have been carefully worked out to give maximum strength without unnecessary weight. The stem, keel and frames are of selected white oak, the frames being mostly steam bent with a few sawn frames as stiffeners. The bottom will be double-planked, as is customary in Hacker craft, and all fastenings of bronze or copper throughout.

The planking and finish throughout is in selected mahogany, with neat interior panelling that is particularly effective. The forward or steering cockpit is equipped with two individual bucket-seats and one athwartship seat, which will seat three persons comfortably. The instrument board is located on the dash forward of the steers are seen as the steer of the steers are steers.

The after cockpit will seat three persons on the athwartship seat and there is plenty of room for two good-sized wicker chairs as well, so that this 28-footer has comfortable seating arrangements for ten persons, which is rather remarkable for a boat capable of such good speed, and practically demonstrates the all-around advantages of the forward-cockpit type of runabout. Added to this, one has only to ride in a boat of this type to become an ardent enthusiast and a booster for its future.

It is worthy of note that the Hacker Boat Co. are preparing to quote on complete boats powered with Hall-Scott engines or they will sell the plans complete with specifications to individuals or boatbuilding companies.

#### The Lebby Searchlight

Unlike so many of the so-called searchlights now in use, many of them mere toys or transformed automobile lamps constructed of materials which undergo rapid deterioration under the action of salt air and water and which bear no resemblance, save in physical appearance, to a true searchlight, the Lebby is in all respects a real marine searchlight whose performance compares most favorably with that of the best high-power are lights in use on our largest steamers.

It is generally conceded that the most powerful searchlights are of the arc type, but these, to operate efficiently, require a voltage and supply of current which cannot be obtained from the sources available on any but the larger steamers. As a consequence, the owner of any smaller craft has but to content himself with some form of searchlight which would operate on a circuit of 32 volts or less and a current flow of not more than seven or eight amperes. The demand for such a light produced a field of which the manufacturers of automobile lights were quick to take advantage, and the market was soon flooded with so-called searchlights which were simply automobile headlights set in different mountings and having a wide divergence and lack of concentration of beam which, even had they produced a powerful light, would have rendered them utterly unable to perform the functions of a marine searchlight.

One of the pioneers in this worthy endeavor was Mr. S. L. Lebby who, after years of experiment with various combinations of different filaments and reflecting media, during which time he was awarded several patents, has finally devised the Lebby Low Voltage Searchlight Projector, which is now being manufactured and offered to the trade by this company.

#### What the National Association Is Doing

(Continued from page 14)

give unstintingly their best endeavors toward making our Shows a credit to the industry from year to year. Due to their experience and demonstrated business sagacity, many pitfalls that might have worked disaster have been avoided, and the Shows have ever been profitable to those who took part in them.

No exhibition should ever truly be placed in the category of a selling enterprise. Back of the Show lies the thought that the public must needs be educated up to the point where its realization of the infinite possibilities of motor boating may be cashed in by the exhibitors in dollars and cents of future business. Advertising appropriations should be, and are, made to cover the expense of exhibiting, and whether or not a single order for his product may be taken at the Show itself, the exhibitor should feel that at least once each year a concerted effort should be made to bring the best productions of his industry to the market place for public inspection.

Thus the annual Show becomes an intimate expression of the very latest and best ideas that the builders and manufacturers have developed. The boats and the engines and the very necessary accessories are spread in fascinating profusion for the eyes of the scores of thousands of visitors to the Show to gaze upon and admire. Coincident with the Show itself, and born of that same desire to attract the public, a wave of publicity is created, the force of which makes itself manifest far into the ensuing production season.

The opportunity for such concerted effort in any industry whose entities are as widely scattered as are those of the motor boat industry, can be developed to the peak only when expression is made through a national trade organization. Co-ordination of effort to bring together the seller and the buyer under proper conditions and atmosphere is admittedly the biggest thing that a national trade organization can do, and of its record of achievements in this line the National Association of Engine & Boat Manufacturers has, indeed, a just claim to be proud.

## 30,000 Standard Reverse

Mr. D. A. Mead, President of the Standard Gear Company, Detroit, Mich., claims that the law of heredity applies to products as well as to persons, and to substantiate it he points to the home in which Standard reverse gears are born, and to standard reverse gears are born, rather a large family but all living and giving a good account of themselves in every-day

Mr. Mead may well be proud of his fac-tory, for it is a model of efficiency and organization. We have seen larger fac-

organization. We have seen larger ractiones, but not many of them building one marine product exclusively, and none more complete or up-to-date in equipment.

The city of Detroit is famed for the quality of machine work in its automobiles and marine motors. The machinists here are accustomed to operating the best

#### Mikioi, the Largest Gasoline Powered Tug, Has a Standard Engine

The growing popularity or guaranteerial commercial boats cannot be questioned by those who with some of the recent The growing popularity of gasoline mapower installations made by the Standard Motor Construction Co., Jersey City, N. J. Although the reputation and value of the Standard engine for big work boats, as well as for cruisers and yachts, was well established before the war, its remarkable record of performance in the hundreds of American and allied subma-rine chasers attracted a great deal of at-tention to the reliability of this heavy duty marine engine in the most difficult kinds of service.

One of the most interesting of their re-cent productions was a 300 H. P. double-

"You can look up the tonnage of the steamer Niagara. She is the largest ocean-going steamer that enters Honolulu harbor, and it took six minutes for the new boat to take her from her berth and turn her to sea. We were three-quarters of a full throttle when we did this, and at 11 o'clock in the night also."

#### Good Lubrication Pays

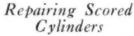
C. M. Addis of the New York Lubricating Oil Co., producers of Monogram oil, says that the conditions of marine motor lubrication are so much more se-vere than automobile lubrication that it is a test which only the best lubricating oils can withstand successfully. Mr. Ad-dis, therefore, points with some pride to the constantly increasing sales of Monogram oil among boat owners and the host of marine users who have remained loyal to Monogram year after year.

Very few motor owners, even very few experts, can tell by the operation of a motor whether the oil used is of the right Of course, it is simple to diag-om such serious results as poor quality. from such serious compression, sooted plugs, carbonized cylinders, pitted valves, or overheated bearings, but the more subtle and more expensive effects of poor lubrication only show up in the long run. When it is found at the end of a season that cylinders, pistons, bearings and shafts are un-duly worn as a result of poor oil, it is too late to remedy the trouble and the owner pays dearly for his lesson.

Good oil is bought on faith—faith in

the dealer who sells it, in the man who makes it or in the name on the can it comes in. While it is entirely possible to buy good oil in bulk, one is never certain he is getting what he asks for unless he gets it in a sealed and branded container. We are all familiar with the dealer who claims to sell several well-known brands of oil—in bulk "to save you the cost of the can.

The makers of Monogram oil are always glad to co-operate with motor manufacturers, dealers or owners in deter-mining the most suitable grade of oil for any particular motor.



The average motor owner dreads a scored cylinder as about the most serious trouble which can happen to his engine. But, as a matter of fact, a badly scored cylinder can be repaired as good as new and at only a fraction of the cost of re-grinding or replacing. The only success-ful method of repair is known as the Lawrence patent process, which is owned and licensed by L. Lawrence & Co., 292 Halsey Street, Newark, N. J.

s is comparatively easy and quick, and as to durability the work is guaranteed to last for the life of the motor. The operation is to fill the scores and defects with a special alloy of silver and nickel, electrically fused. No heat is applied to the cylinder, so that there is no chance of damage or warping. After the repair is completed the original piston and rings fit the same as before, so that the great expense of replacing with new oversize parts as when reground

is saved.

The complete success of the Lawrence process may be judged from its history. L. Lawrence & Co. has been in business since 1862 and the demand for their work has made it necessary to establish a dozen branches in the principal motor centers of the country, and about a hundred service stations in all.



The type of automatic machinery which is used by the Standard Gear Company in producing the Standard Reverse Gear

of modern machine tools, and they are accustomed to the close limits of accuracy suggested by those familiar words-quantity production, standardization and interchangeability.

Of course, the present popularity of Standard gears is not entirely dependent upon the organized efficiency of the fac-tory, for the average buyer thinks more of the product than of its origin. Standard has won so many friends be-cause it is strong, simple and compact, easy to adjust and built to endure constant service with little wear.

A most important feature is the complete enclosure of the gear in a neat, tight-fitting case. Enclosure has been a Standard feature for many years and its great desirability is proved by the fact that the highest priced marine motors are now built with every moving part en-closed—flywheel, lubricators, valve mechanism, etc., as well as reverse gear. This safer and not only is more attractive, safer and cleaner because it does not throw oil or grease about the boat, but it permits running the gear in a bath of oil which reduces friction, noise and wear to the very minimum. A ball thrust bearing is an integral part of the Standard, being located inside of the case and running in oil.

Standard reverse gears are made in four sizes, which cover practically every marine motor requirement. These gears are on exhibition at the Motor Boat Show, Space 39.

acting Standard engine for Mikioi, the largest gasoline-powered tug ever built, completed last summer by W. F. Stone & Son of Oakland, Cal., for Young Bros., Son of Oakland, Cal., for Young Bros. Ltd., Honolulu, Hawaii. Mikioi made a remarkable maiden voyage from San Francisco to Honolulu, doing 2,200 nautical miles in ten and a half days through extremely rough weather.

The following letter from Mr. Harry Mikioi,

Davis, the chief engineer or speaks for itself:

"The new boat handles the between the United that ply between the steamers States, Honolulu and the Orient. Steamers have to be shifted from one pier to

another and also pulled out of the slip and turned for sea.

"Honolulu harbor is very small and great care in handling and a perfect working engine is required. If ever any serious trouble should happen to an engine, considerable damage is liable to hap-pen. This is why Young Bros, give so much attention to all engines so that they are always in the best of condition. I have been instructed to take no chances and keep everything at its best.

"And take it from me, there is very litand take it from the, there is very fit-tle slip in the propeller. You know, four blades over eight feet under water is something to get over against the head-way of the tow. The trade winds here are bad on all tows; that's what causes so much backing and filling.

"In all our tows so far we have never had to use the full open throttle.

# Cruise with MoToR BoatinG for the Coming Year

YOU'LL be surprised how much more pleasure and interest you will take in your boat if you read MoToR BoatinG every month. Winter or summer, fitting-out season or hauling-out time, this magazine will entertain and guide you whether you own a little one-lunger or the latest thing in express cruisers.

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you will find it in MoToR BoatinG. Authoritative articles by the best writers in the field, authentic racing news by men who conduct and officiate at the big races, stories on every boating subject, always written in the most interesting way and profusely illustrated with good photographs of the newest and best boats. Everyone admits that MoToR BoatinG is the most attractive boating magazine.

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Your subscription for MoToR BoatinG is the best \$3.00 investment you can possibly make for your boat. It will save its cost many times over, and return again in pleasure increased a hundred fold. MoToR BoatinG is the most expensively edited and printed magazine in the field, the best from every standpoint. If you read any boating paper why not the best?

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N. B. If you wish any special information from the editors, please enclose a separate letter.

When writing to advertisers please mention MoToR BOATING, the National Magazine of Motor Boating

#### Marine Moto Meters

The Moto Meter Company are showing a Speedway motor their booth. This motor will have a control board on which in their booth. will be mounted two or three different Marine Type Boyce Moto-Meters. These instruments will be connected to the various parts of the engine.

various parts of the engine.

They also have on display separate parts of their different instruments, so as to better show their construction. Distance Type Boyce Moto-Meters, Models A, B and C will, of course, be on exhibition, as well as our new Model "E."

A full-sized colored chart of the engine is exhibited, showing lubricating system, cooling system, etc. This chart illustrates the by-pass arrangement for the cooling system, which we recommend to be used in conjunction with the Marine Type Boyce Moto-Meter.

#### Kauri Varnishes

The sales of Kauri Waterproof Varnishes, made by the Brooklyn Varnish Manufacturing Co., have increased to such an extent that in order to properly display their line they have secured booths Nos. 26 and 27, where their products may be inspected.

The principal feature of their exhibit consists of a practical demonstration of the beautifying and enduring qualities of Kauri varnishes, accomplished by the use of solid panels, five by eight feet in size, cut from the burl found on the giant California redwood trees, and finished with Kauri.

The burls are very rare and are found upon these giant trees in the shape of a swelling or protuberance. The burl grows on the trunk and was undoubtedly caused by an injury to the tree during its growth. It develops into a mass of woody tissue of very intricate design, and is considered the most beautiful wood in the world. It takes from three to five years to season a burl preparatory to cutting it into panels such as are on display.

Due to the purchase of the remaining giant redwood forests by the United States Government, the supply of these burls is nearing exhaustion. The panels on exhibition were procured under the most difficult circumstances and are of great value.

Protected with a beautiful, rich, weather-resisting finish of Kauri Waterproof Varnish, these panels will last indefinitely.

#### Reliance Controls

The W. S. Hall Co., of Rochester, exhibit at Booth 42 on the mezzanine floor, has a complete line of Reliance steering and engine controls, bridge-deck and engine controls for both twin

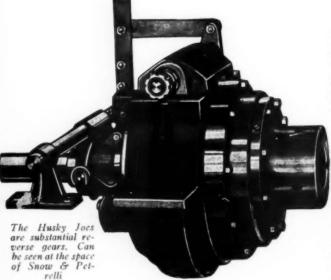
and single-engine installations.

They also exhibit the new Reliance Electric Marine Reverse Gear Control, which controls the reverse lever from any number of positions without the use of levers, rods, cranks, etc., which

so often cause so much complication.

#### Durkee Hardware

C. D. Durkee & Co., New York, are exhibiting as usual their very complete assortment of hardware of all kinds. Included among these are found anchors, telegraphs, steerers, binnacles and compasses, the Andrade Windlass, cabinet hardware, deck fittings and other items too numerous to mention.



#### Evinrude Motors

In space "C" the Evinrude Motor Company, of Milwaukee, Wisconsin, have a complete display of Evinrudes—Rowboat and Canoe Motors, Inboard Motors, Canoes and Evinrude Rowboats, both round and flat bottom.

The motors shown are of the very latest type. A speed canoe equipped with an Evinrude Inboard Motor will interest those who are looking for a light, easily handled, speedy craft. Round and flat bottom rowboats, built especially for Evinrudes, will interest those who care more for safety than speed.

The exhibit is in charge of Evinrude's New York distributor,

Mr. Oluf Mikkelsen. Members from the home organization in Milwaukee are also present.

#### Delco-Light Electric Plant

The new ¾ K. W. marine type of Delco-Light plant is on exhibition at booths 14-15. This plant consists of a direct connected engine-generator unit, standing only 21" high and requiring a floor space of only 21 x 19". The output is 750 watts at 32 volts. The battery is either an 160 ampere hour or 60 ampere hour marine type.

The Delco-Light plant is interesting because it is entirely

air cooled. The plant is interesting because it is entirely air cooled. The plant cranks from battery at the pressure of a switch and stops automatically when battery becomes fully charged. The fuel is either gasoline or kerosene. The unit has but one place to oil, has no magneto or carbureter and the charged. The fuel is either a but one place to oil, has n bearings are roller and ball.

Delco-Light provides complete electric service for the boat. Not only can plenty of lights be used, but the many convenient electrical appliances will make yachting a real pleasure. Fans, a percolator or grill, a small heater, searchlight, pumps, electric irons can all be operated in addition to lights. Current is available at all times, even though a boat has been tied up in harbor for a length of time.

The Delco-Light pressure water system is also on exhibition. Booth in charge of Mr. O. Chris Olsen, of the New York

#### Marburg Bros. Show Foreign Motor

Marburg Brothers, Inc., New York, are exhibiting at Space 13, Mezzanine Floor, a Swedish Ellwe solid-injection Diesel engine for the benefit of engineers or motor manufacturers who may be interested in licensee arrangements. The engines are manufactured under the Leissner gasifier patents, of which Mar-burg Brothers, Inc., are the exclusive representatives for the American Continent. It is claimed that the gasifier, which can American Continent. It is claimed that the gasifier, which can be applied equally well to four-cycle and two-cycle motors, makes it possible to burn cheap fuel oil. Indicator diagrams taken with engines equipped with Leissner gasifier, and shown by Marburg Brothers, Inc., prove the characteristic feature of a smooth-running Diesel engine. The Ellwe engine combines utmost simplicity and compactness with the advantages of the regular Diesel engine, namely: combustion of cheap fuel and very smooth running. Other features are described in this issue in connection with engines of the Mianus Motor Works, of Stamford, Conn., who are licensees under the Leissner gasifier patents.

#### Sperry Gyroscope Co. Show Compass

The Sperry Gyroscope Company, of Brooklyn, N. Y., are exhibiting at Space 91, on the mezzanine floor, their usual display of ship's stabilizers and Gyro Compass equipment. In addition, their electric log and shoal water alarm, with their Dead Reckoning Equipment, is shown. A model of Edgar Palmer's Auxiliary Schooner Yacht, Guinvere, which is completely equipped with stabilizers, and Gyro Compass Equipment is also on display. Other interesting navigational instruments and the high intensity Sperry Search Light are also on hand for the view of those interested.

#### Complete Line of Palmer Motors

Palmer Brothers Engines, of Cos Cob, Conn., are being exhibited in Space C, on the main floor, as usual. A complete line of these motors in two and four cycle types are on display, including everything from the small single cylinder, two-cycle motor to the largest six-cylinder, four-cycle gasoline motor which they turn out. Their small bronze centrifugal pump is

Verrier Eddy Company, of New York, are exhibiting a com-plete range of Lathrop motors, for which they are the New York agents. These motors are all equipped with the new pressure oiling system and the oil is filtered and cooled before it is returned to the crank case. The two-cycle motors manufactured by the Lathrop Company are also included in the

# THE MEN WHO RUN THEM ARE THE MEN WHO KNOW

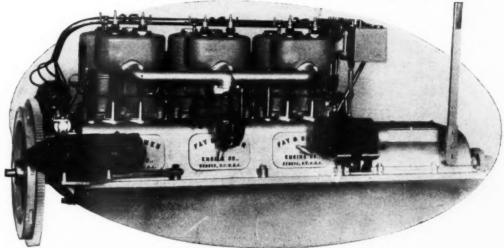


Water Witch, 54 x 10.
Owned by Richard Menzel, Esq., 508 Granby St., Norfolk, Va.
Powered with Fay & Bowen Model L-64

We quote from letters written us by Mr. Menzel dated Sept. 14 and Sept. 18; 1920

"I have just returned from a two months' cruise as far east as Marblehead and I cannot praise engine enough for its consistent and perfect behavior on this long cruise, on one occasion running twenty hours without ever missing a beat."

"The tests to which I subjected your engine were severe, the boat most always pitching in a sea and the engine at all times ran without a miss. I could not help but enjoy that feeling of security a good engine only can give."



Model L-64, 6-Cyl., 5 x 61/4, with Electric Starter

## Fay & Bowen Engine Company

104 Lake Street

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U. S. A.

NEW YORK: 44 Third Ave., at 10th St., Sutter Bros., Representatives. PHILADELPHIA: 116 Walnut St., Marine Equipment & Supply Co., Representatives. BOSTON: 100 Atlantic Ave., C. B. Hamblen & Co., Representatives. CANADA: Brockville, Ont., St. Lawrence Engine Co., Representatives.

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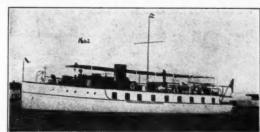
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No. 5997—90 ft. power house yacht. One of the most desirable yachts of the type. Available for purchase or charter. Frank Bowne Jones, Yacht Agent, 29 Broadway, New York.



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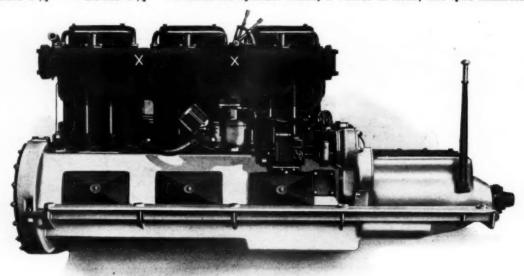
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### THE LATEST HEAVY AND MEDIUM DUTY STERLINGS

Bore 53/4" — Stroke 63/4" Detachable cylinder heads, 3 valves in head, hot spot manifold



Model GM-6 cylinder motor, illustrating hot spots at "X"

AFTER having been tested out thoroughly for months, and after a season of actual use in boats, these models are announced with the greatest confidence as being the highest possible development of the gasoline marine engine for medium and low speed work. They have been designed expressly to burn the current lower grades of commercial gasoline.

Two years ago Sterling Engineers believed it necessary to redesign, rather than to attempt to adapt our "L" or "T" head motors to this gasoline by any pre-combustion or pre-heating devices. The GM models may be throttled to 300 R.P.M. under load for trolling and manoeuvering.

The fuel consumption is under .65 lbs. per B.H.P. hour, the oil consumption is under .04; the figures being far higher than actual consumption, which is near a record for economy.

| G<br>Heavy  | Revolutions<br>400<br>600 | 4 cyl. H.P<br>30<br>46 | 6 cyl. H.P.<br>45<br>69 | 8 cyl. H.P<br>60<br>92 |
|-------------|---------------------------|------------------------|-------------------------|------------------------|
|             | 800                       | 63                     | 94                      | 126                    |
| GM          | 1000                      | 81<br>98               | 120<br>145              | 162<br>195             |
| Price F. O. | B. Buffalo                | \$3,150                | \$4,000                 | \$5,000                |

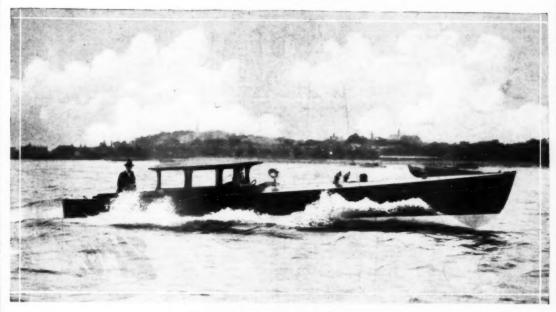
Special features consist of three overhead valves in detachable cylinder heads, hot spot manifold, complete enclosure, electric starter and generator, double ignition, oil filtering system, heavy reverse gear and other usual Sterling features. May we send literature?

#### STERLING ENGINE COMPANY

1254 Niagara St.

Buffalo, N. Y.

(Exhibiting at the New York Show, Grand Central Palace, Dec. 10-18, 1920)



Forty-one foot Sedan runabout designed and built by Lawley. Motor Model GR, 300 H.P., 8 cylinder, dual valve Sterling, Speed 30 M.P.H.

BY far the finest type of boat launched in recent years is the sedan runabout. Its advantages as a means of conveyance to and from a club house, or from island home to mainland in inclement weather are so apparent as to need no dilation. Again, for social purposes, with the sedan runabout one can travel at high speed in dry security to and from formal social events. The appeal is decidedly to feminine guests and to those who do not wish to risk a drenching from flying spray, nor compromise by checking speed.

The vogue of the sedan runabout is accompanied by an increased speed, with dual valve engines recently developed, for no more than that a royal equipage of regal days could be passed in parade by a bourgeoise, should a superb vessel of this type concede first place to any other.

The high powered dual overhead valve Sterlings are as necessary to the sedan runabout as authority was to the royal coach two hundred years ago. More commanding, since the authority is that of incontestable enduring speed.

Dual overhead valve Sterlings. Bore 5 ¾". Stroke 6 ¾". 4-cylinder, 150 H.P.; 6-cylinder, 225 H.P.; 8 cylinder, 300 H.P.

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